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ABSTRACT

At the request of the Curriculum Department and the Chapter I program coordinators of the Portland Public Schools, three different instructional programs were evaluated during the 1981-82 school year. (1) The Help One Student to Succeed (HOSTS) program provided a person-to-person structured tutorial program in reading using volunteer tutors. (2) Prescription Learning is a multi-media management program in which the computer is used in program management and is also one of the instructional media to teach reading and math. (3) Computer-Assisted Instruction involves the student interacting with a computer for ten-minute intervals usually following teacher-directed instruction as supplementary instruction in reading and mathematics. For each of the presented programs, effectiveness in one or more of the basic skills was measured on a student-by-student basis. Progress for each student was matched and compared with their progress during the previous school year, and with the progress of the total Chapter I student population. Summary findings from the three programs, as well as, detailed results for each program and for the Chapter I population are presented. (PN)

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EVALUATION REPORT ON THREE NEW INSTRUCTION PROGRAMS:

- **HELP ONE STUDENT TO SUCCEED.**
- **PRESCRIPTION LEARNING.**
- **COMPUTER-ASSISTED INSTRUCTION.**

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TM 830 591

SUMMARY OF

EVALUATION REPORT

ON

THREE NEW INSTRUCTION PROGRAMS:

HELP ONE STUDENT TO SUCCEED
PRESCRIPTION LEARNING
COMPUTER-ASSISTED INSTRUCTION

DECEMBER 1982

RESEARCH AND EVALUATION DEPARTMENT

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EVALUATION REPORT
NEW INSTRUCTIONAL PROGRAMS

At the request of the Curriculum Department and the Chapter I program coordinators of the Portland Public Schools, three different instructional programs were evaluated during the 1981-82 school year. Each of these programs were placed in three or more schools with the purpose or enhancing performance in basic skills of low achieving students.

These programs were HOSTS, Prescriptive Learning and Computer-Assisted Instruction. The HOSTS program provided a person-to-person structured tutorial program in reading using volunteer tutors. Prescription Learning is a multi-media management program in which the computer is used in program management and is also one of the instructional media. Prescription Learning was used to teach reading and math. Computer-Assisted Instruction involves the student interacting with a computer for ten-minute intervals usually following teacher-directed instruction. Computer-Assisted Instruction was used to supplement instruction in reading and mathematics. Each of these programs is described in detail in its accompanying report.

For each program, effectiveness in one or more of the basic skills was measured on a student-by-student basis. Progress for each student in the new instructional program for 1981-1982 was matched and compared with their progress during the previous school year, 1980-1981 and with the progress of the total Chapter I student population during 1981-1982. The average gains of the students were obtained in groups sufficiently large to judge the degree of effectiveness of each program as it was implemented in the elementary schools.

This methodology uses students as their own control group which precludes the question of comparability of groups for comparing effectiveness of new learning situations with previous schooling. It also controls for regression to the mean - an error associated with test-retest designs. Summary findings from the three programs are presented in Table I. Detailed results for each program and for the Chapter I population are presented in Tables II and III.

TABLE I

	No. of Students	No Gain or Loss	Positive Non-Significant Gain	Positive Approaching Significance	Positive Significant Gain
Help One Student to Succeed (HOSTS)					
Reading	124			X	
Prescription Learning (PL)					
Reading	434	X			
Math	446		X		
Computer-Assisted Instruction (CAI)					
Reading	150		X		
Math	133		X		

CONCLUSIONS

As Table I shows, none of the three programs depressed achievement in any group or subject, nor did any of them produce positive, significant achievement gains.

1. HOSTS achievement results are so close to significance at the five-percent level for reading, that it should be considered a successful instructional innovation. Since new programs are often applied with more care and enthusiasm the first year (Hawthorne effect) than in subsequent years, it is important to continue monitoring achievement results from HOSTS programs for at least two more years.

2. Prescription Learning achievement results from this first year of operation were about the same as those that could have been expected if the student's instructional program of the previous year had been continued. Since this finding is consistent with findings from another school district where Prescription Learning was used with Chapter I students, a careful review of the curricular activities and the mechanics of the equipment used is indicated.

3. Computer-Assisted Instruction achievement results are not sufficiently impressive to support the contention that either of the software/hardware combinations used in this study are a successful innovation (i.e, CCC and TRS-80).

The second and third conclusions on the lack of demonstrated superiority of computer related teaching of basic skills are consistent with findings nation-wide. Henry Jay Becker from John Hopkins University ended his 1982 report, "Microcomputers in the Classroom -- Dreams and Realities," with this paragraph (p. 76):

> "The advances being made during this decade in the capacity of electronic media to store, retrieve, and process intellectual information at a steadily decreasing cost is one of the more exciting trends in an often-discouraging world. Someday, schools may be able to use the fruits of this technological advance to help children and adolescents attain greater academic competencies and skills than the generations before them. However, it will not help for us to uncritically accept every "computer-based" anything that comes to market. We must think clearly about how we want our children's education to improve, what computers can do to help, how that assistance can, in fact, be accomplished, and whether any of this is affordable. Through appropriate research, well-organized strategies of educational program development, and careful policy-making and staff development by school systems, we may be able to make today's dreams about computers and kids into tomorrow's realities." (underlining added)

RECOMMENDATIONS

It is evident that other software, other curriculum or instructional activities, and other scheduling patterns than the ones used in 1981-82 should be tried under carefully controlled conditions at the same time as the three programs studied here are continued and carefully evaluated. Learning if and how computer capabilities can be more effective and efficient than traditional approaches to instruction will aid school districts in making implementation decisions.

Recommendations for focuses of such further study:

1. Instruction time on task, including length and frequency of periods on the computer.

2. Transfer of learning from computations on the computers to pencil and paper type operations.

3. Retention of learning over time when it can be attributed to CAI and compared with results from other teaching methodology.

4. Curriculum content presented and type of reaction required by the learner.

5. Characteristics of students who will profit most from CAI.

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TABLE II

Math Standard Deviation Means for PL, CAI and
District Chapter I Students for 1980-81 and 1981-82 by Grade

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference	N	Rate
GRADE 3					GRADE 4						
PL	7	--	--	--	PL	8	--	--	--	5	--
CAI	--	--	--	--	CAI	--	--	--	--	--	--
Chapter I, Dist.	293	-2.51	-2.84	-0.33	Chapter I, Dist.	375	-2.59	-2.35	0.24	274	0.58
GRADE 4					GRADE 5						
PL	20	-1.89	-2.20	-0.31	PL	29	-2.59	-2.26	0.33	20	0.46
CAI	24	-3.49	2.58	.61	CAI	35	-3.80	-2.70	1.29	20	.59
Chapter I, Dist.	330	-2.64	-2.75	-0.11	Chapter I, Dist.	407	-2.79	-2.49	0.30	297	0.22
GRADE 5					GRADE 6						
PL	75	-2.39	-2.62	-0.23	PL	86	-3.06	-2.90	0.16	71	0.32
CAI	49	-2.47	-2.41	-.11	CAI	54	-2.59	-1.88	.71	40	.52
Chapter I, Dist.	358	-2.51	-2.61	-0.10	Chapter I, Dist.	425	-2.94	-2.70	0.24	336	0.24
GRADE 6					GRADE 7						
PL	84	-2.54	-2.63	-0.09	PL	106	-3.45	-3.09	0.36	81	0.26
CAI	48	-2.38	-2.60	-.04	CAI	57	-2.74	-2.24	.50	45	.52
Chapter I, Dist.	309	-2.68	-2.71	-0.03	Chapter I, Dist.	361	-3.15	-2.75	0.40	282	0.42
GRADE 7					GRADE 8						
PL	67	-2.87	-3.02	-0.15	PL	75	-3.43	-3.03	0.40	66	0.57
CAI	31	-2.11	-1.89	.44	CAI	38	-2.41	-1.92	.49	28	.30
Chapter I, Dist.	275	-2.62	-2.62	0.00	Chapter I, Dist.	320	-3.14	-2.73	0.41	256	0.34
TOTALS					TOTALS						
PL	253	-2.51	-2.69	-0.18	PL	304	-3.21	-2.88	0.33	243	0.43
CAI	152	-2.53	-2.39	.14	CAI	184	-2.83	-2.16	.71	133	.48
Chapter I, Dist.	1565	-2.59	-2.70	-0.11	Chapter I, Dist.	1888	-2.91	-2.60	0.31	1445	0.35

TABLE III

Reading Standard Deviation Means for HOSTS, PL, CAI and District Chapter I Students for 1980-81 and 1981-82 by Grade

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference	N	Rate
GRADE 3					GRADE 4						
HOSTS	55	-3.06	-3.48	0.42	HOSTS	68	-3.28	-3.00	.28	49	.57
PL	7	-1.35	-2.73	-1.38	PL	9	--	--	--	6	--
CAI	--	--	--	--	CAI	--	--	--	--	--	--
Chapter I, Dist.	344	-2.52	-2.62	-0.10	Chapter I, Dist.	442	-2.83	-2.54	0.29	321	0.33
GRADE 4					GRADE 5						
HOSTS	45	-3.36	-3.38	-.02	HOSTS	57	-3.79	-2.67	1.12	39	1.18
PL	17	-2.42	-2.53	-0.13	PL	30	-3.59	-2.87	0.72	19	0.36
CAI	38	-2.95	-3.03	-.08	CAI	45	-3.80	-3.08	.72	34	.66
Chapter I, Dist.	350	-2.78	-2.84	-0.06	Chapter I, Dist.	436	-3.16	-2.71	0.45	318	0.42
GRADE 5					GRADE 6						
HOSTS	19	-2.11	-2.28	-.17	HOSTS	25	-2.97	-2.69	.22	18	.44
PL	71	-2.48	-2.52	-0.04	PL	81	-3.07	-3.19	-0.12	69	-0.02
CAI	64	-3.39	-3.36	.03	CAI	72	-3.74	-3.24	.49	58	.48
Chapter I, Dist.	358	-2.57	-2.56	-0.01	Chapter I, Dist.	442	-2.96	-2.71	0.25	341	0.16
GRADE 6					GRADE 7						
HOSTS	7	--	--	--	HOSTS	7	--	--	--	--	--
PL	73	-2.78	-2.86	-0.08	PL	87	-3.28	-3.06	0.22	68	0.20
CAI	45	-3.49	-3.57	-.08	CAI	54	-3.94	-2.03	.70	41	.68
Chapter I, Dist.	343	-2.61	-2.72	-0.11	Chapter I, Dist.	393	-3.07	-2.85	0.22	308	0.24
GRADE 7					GRADE 8						
HOSTS	8	--	--	--	HOSTS	9	--	--	--	--	--
PL	66	-2.53	-2.98	-0.45	PL	74	-3.33	-3.25	0.08	58	0.44
CAI	23	-4.30	-3.99	.31	CAI	23	-4.78	-4.36	.43	17	.16
Chapter I, Dist.	289	-2.67	-2.95	-0.32	Chapter I, Dist.	329	-2.97	-2.90	0.07	262	0.26
TOTALS					TOTALS						
HOSTS	136	-2.96	-3.17	-.21	HOSTS	265	-3.16	-2.75	.40	124	.72
PL	234	-2.55	-2.76	-0.21	PL	281	-3.26	-3.10	0.16	220	0.23
CAI	170	-3.44	-3.43	.02	CAI	194	-3.96	-3.36	.60	150	.52
Chapter I, Dist.	1684	-2.63	-2.73	-0.10	Chapter I, Dist.	2042	-3.00	-2.73	0.27	1550	0.28

EVALUATION REPORT

ON

HOSTS

HELP ONE STUDENT TO SUCCEED

November 1982

David Leitner

Portland Public Schools

4131a/229a

HOSTS

"HELPING ONE STUDENT TO SUCCEED"

HOSTS is a nationally validated Title I exemplary program adopted by 22 schools in the Portland School District. It has operated in three schools since 1979-80 and was introduced to 19 more in 1981-82 with substantial support coming from the Murdock Foundation. Nineteen of the 22 schools are Title I schools and adopted HOSTS as their Title I reading project. The three non-Title I schools also used HOSTS as supplemental reading instruction for low performing students but supported it by general fund monies in addition to seed money from Murdock for training and materials.

HOSTS is a diagnostic, prescriptive program that was designed to help low performers learn to read. It provides individualized instruction on a one-to-one basis through the use of volunteer tutors. The diagnostic, prescriptive and instructional procedures are outlined by HOSTS and were essentially the same for all schools. HOSTS students were tested individually by the HOSTS teacher at the beginning of the year with an individual reading inventory (Silvarolli or John's). Results from the individual reading inventory were used to place students at the proper test level in the Fountain Valley Developmental Skills Test which identified individual skill deficiencies, and to identify the students independent, instructional and frustration reading levels. The HOSTS Survey of Developmental Tasks was administered to students who scored below the range of the Fountain Valley. Once twelve to fifteen skill deficiencies were identified, teachers wrote long-range individual prescriptions and daily lesson plans based on the long-range prescriptions. The daily lesson plans were implemented by trained volunteers under the direction of the teacher. Usually, students were instructed in two objectives per session and continued in an objective until mastery was achieved which was determined by informal testing or by administering specific portions of the Fountain Valley. HOSTS students received instruction for 30 minutes a day, four days a week from a tutor. Testing and teacher planning was scheduled for the fifth day. Students were tested at mid-year and at the end of the year using the individual reading inventory to measure progress and to determine if students retained those skills that were mastered.

HOSTS Characteristics in Portland Schools

Student Selection

Title I eligibility requirements (i.e., a P score of 43 or below and/or teacher judgment) were used for selecting HOSTS students in the 19 Title I schools. Additional criteria were established at 10 of the 19 Title I schools who had the choice of placing students in either HOSTS or other Title I activities. Schools used different criteria such as selecting low Title I students, high Title I students, or ones who could benefit from one-to-one instruction. The three non-Title I schools also selected students based on

Title I selection criteria or if students met Special Education criteria. Overall, the type of student selected for HOSTS met Title I eligibility requirements.

Grades Served and Number of Students

The PPS HOSTS program served students in the entire K-8 grade range; however, most students were in Grades 1-5 (Table I). One school served kindergarten students while a few included students in the higher grades. A total of 814 students received HOSTS services during the year with approximately 700 students being served at any one time. The difference between the total number served and the number served at any one time reflects the mobility of students in and out of the program due to various reasons (availability of tutors, moving and different start-up times).

Number of Tutors

A total of 880 tutors were working in HOSTS when the schools were surveyed in April-May. This included 396 community members, 356 cross-age students, 110 teaching staff and aides, 10 high school students and 8 college students. The total number of tutors who volunteered during the year was higher, but complete data are unavailable.

Staff

Each school HOSTS program was staffed by a certified teacher who served as HOSTS coordinator. The coordinator was responsible for testing students, writing long-range individual prescriptions and daily lesson plans. Coordinators were assisted by one to three aides, depending upon the size of the program.

Training

The HOSTS Corporation provided four days of training for teachers and aides at the beginning of the school year. In addition, trainers from HOSTS Corporation spent a half-day in each school during November/December, 1981. The purpose of the school visitations was to check compliance with expected HOSTS program procedures and to provide technical assistance. The information collected from the interviews was reviewed with the schools and sent to the District HOSTS coordinator for follow-up. HOSTS trainers were available on request also at the end of the year for school visitations.

The District HOSTS coordinator held two series of cluster meetings designed to provide time for sharing ideas on teaching practices, recruiting volunteers, writing prescriptions, etc. A Teacher Inservice Credit workshop was held in March on HOSTS instructional practices.

Table I

HOSTS CHARACTERISTICS

SCHOOLS	GRADES	NUMBER OF STUDENTS	NUMBER OF TUTORS	TYPE OF TUTOR					
				Community Member	College Student	High School Student	Cross-Age Student	Teaching Staff and Aides	Mixed
Abernethy	2-5	38	27	11	2	-	13	1	-
Beach	3-5	25	28	25	-	-	-	3	
Creston	2-3	30	51	22	-	1	25	3	-
* Edwards	1-4	9	6	3	-	-	3	-	-
George	1-3	40	87	16	-	-	67	4	-
Grout	2-5	43	33	12	-	-	17	4	-
* Hollyrood	K-3	24	44	25	-	9	8	2	-
Humboldt	2-3	40	13	7	-	-	1	5	-
Irvington	2	24	51	25	-	-	19	7	-
James John	2-3	30	71	9	-	-	60	2	-
King	1-5	50	49	24	-	-	7	18	-
Lane	3-5	34	28	28	-	-	-	-	
Lent	1-8	37	58	32	-	-	23	3	-
Marysville	2-8	38	47	26	-	-	16	5	-
Rice	1-4	20	32	25	-	-	7	-	-
Rieke	2-5	22	30	20	-	-	7	3	-
Richmond	2-5	37	38	26	-	-	7	5	-
Rigler	2-3	24	25	16	-	-	8	1	-
Sabin	2-5	44	81	25	-	-	24	32	-
* Scott	2-6	27	17	8	-	-	6	3	-
Sitton	2-5	28	21	2	-	-	16	3	-
Vestal	1-8	43	43	9	6	-	22	6	-
		707	880	396	8	10	356	110	

* Non-Title I Schools

EVALUATION

An evaluation was conducted to investigate the effects of the HOSTS program. It compared the achievement gains of Title I students who were in the HOSTS program with three different populations: (1) Non-HOSTS, i.e., Title I students in the same grades and schools as HOSTS students who received regular Title I reading instruction; (2) District Title I students; and (3) District students. Next, the achievement growth of HOSTS students in 1981-82 was compared with their achievement growth in 1980-81. Student achievement was measured by the administration of the Comprehensive Test of Basic Skills, Primary B and C (Grade 2), and the Portland Achievement Levels Tests (Grades 3-8) in fall and spring of 1981-82.

The evaluation also investigated the relationship between student achievement and three variables; the type of tutor each HOSTS student had, the subject that students missed by attending HOSTS, and time in the program. The data are presented in the following sections: grade 2; grades 3-8; the relationships between student achievement and tutor, subject missed and time in the program.

GRADE 2

The District Title I program administers the Comprehensive Test of Basic Skills, Primary B and C, to grade 2 students for evaluation purposes. Primary B is administered in Fall and schools are given a choice of administering either Primary B and/or C in Spring depending upon their students' achievement levels. For Title I purposes the results are reported in two groups: students who take Primary B in Fall and Spring (B-B test sequence); and, for students who take Primary B in Fall and C in Spring (B-C test sequence). The HOSTS's grade 2 data are reported in the same manner.

Tables II and III show the pre- and post-test means for HOSTS, non-HOSTS and District Title I students in grade 2. Table II shows the results for students taking the B-B test sequence while Table III shows the results for students taking the B-C sequence. Data were available for 17 HOSTS schools and 34 District Title I schools. All scores are based on matched fall/spring scores. Results are expressed in terms of expanded scale score means and corresponding percentiles.

TABLE II

Grade 2
Fall 1981, and Spring 1982, Expanded Scale Score and Percentiles
for HOSTS, Non-HOSTS, and District, Title I Students
Primary B - Pre and Post Test

SCORE	GROUP	N	FALL	SPRING	GAIN
Expanded Scale Score	HOSTS	22	248	287	39
	Non-HOSTS	48	256	278	22
	District/Title I	145	239	278	39
Percentile	HOSTS	22	17.0%	26.5%	9.5%
	Non-HOSTS	48	21.0%	22.0%	1.0%
	District/Title I	145	13.0%	22.0%	9.0%

The results indicate that Grade 2 HOSTS students made gains equivalent to District Title I students according to both test sequences. In addition, HOSTS students made gains equivalent to non-HOSTS according to the B-C test sequence, but a larger gain according to the B-B test sequence.

To determine if schools with more experience with HOSTS would make greater gains, the scores of schools with three year's experience were compared with schools with only one year. Table IV shows the expanded scale score and percentile means for 13 first-year and three third-year HOSTS schools using the Primary B-C test sequence. Data were insufficient for schools using the Primary B-B test sequence. The results show first-year schools made gains equivalent to the third-year schools.

TABLE III

Grade 2
Fall 1981, and Spring 1982, Expanded Scale Score and Percentiles
for HOSTS, Non-HOSTS, and District, Title I Students
Primary B - Pre-Test and Primary C Post-Test

SCORE	GROUP	N	FALL	SPRING	GAIN
Expanded Scale Score	HOSTS	139	261	305	44
	Non-HOSTS	65	267	314	47
	District/Title I	337	262	305	43
Percentile	HOSTS	139	24.40%	37.0%	13.0%
	Non-HOSTS	65	28.0%	42.0%	14.0%
	District/Title I	337	24.5%	37.0%	13.0%

TABLE IV

Fall 1981, and Spring 1982, Expanded Scale Score and Percentiles
for First- and Third-Year HOSTS Schools
Using Primary B, Pre-Test - Primary C, Post-Test

SCORE	GROUP	N	FALL	SPRING	GAIN
Expanded Scale Score	First Year	117	261	306	45.0
	Third Year	22	259.5	304	44.5
Percentile	First Year	117	24.0%	37.0%	13.0%
	Third Year	22	23.0%	36.0%	13.0%

In summary, the data for Grade 2 shows:

- HOSTS students made gains equivalent to District, Title I students.
- HOSTS students made gains equivalent to non-HOSTS in the Primary B-C test sequence and larger gains in the Primary B-B test sequence.
- The gains of first-year schools were equivalent to the gains of third-year schools indicating that experience with the program is not an advantage to achievement.

GRADES 3-8

Student achievement was measured by the administration of the Portland Achievement Levels Test in reading in fall and spring of 1981-82. The results are reported in Rasch Calibrated Units (RIT scores) and standard deviation units. RIT scores are based on an equal interval scale that range from 140-280 and represent how well a student is achieving in the Portland curriculum from grades 3-8. The standard deviation units represent how much the RIT means deviate from the District average.[1] They range from +3 to a -3.

The HOSTS data include students from 22 HOSTS schools who were in the program a minimum 16 weeks. This represents half of the time between the beginning of school to the post-test date. Students in the program less than 16 weeks were not included in the tables, but their results are mentioned in this section of the report.

The data are presented in two tables: Table V shows RIT means and Table VI shows the RIT means in standard deviation scores. Both tables show clear and intact group means for HOSTS, non-HOSTS, District Title I, and District students for the 1980-81 and 1981-82 by grade. In addition, Table VI shows the total deviation means of all students across grades, thus, producing an overall program total. Two items may require explanation. First, clear and intact groups include students who had fall and spring test scores for a given year and were enrolled at the same school in fall and spring. Second, the 1980-81 data represent that year's test scores for 1981-82 students.

Overall, the total deviation means in Table VI show HOSTS students tend to be the lower performing students in 1980-81 and 1981-82. The 1981-82 results show that all three Title I groups made slightly larger gains than District students. Most importantly, HOSTS students had slightly larger gains than non-HOSTS and District Title I students. An analysis of the 1981-82 results by grade shows HOSTS students made gains equivalent to the Title I comparison groups in grades 4 and 6, a smaller gain in grade 3, and a considerably larger gain in grade 5. The sample size in grades 7 and 8 was too small to interpret.

Results for HOSTS students regardless of time in the program, although not shown, were calculated. These results include data from students in HOSTS less than 16 weeks as well as more than 16 weeks. It represents a more equivalent comparison group to District Title I students who were also selected regardless of time. When the data for HOSTS, regardless of time, are examined the overall gains for HOSTS students are not changed. Thus, the exclusion of students in HOSTS less than 16 weeks from the HOSTS data does not effect the comparison of the HOSTS data to District Title I data.

Data for this year's HOSTS students from 1980-81 show they were the lower performing students. The results show also HOSTS students had smaller gains than District, Title I students and District students in the three grades in which data was available and had mixed gains as compared with non-HOSTS students.

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[1] In this case, the District average is the mean of school means.
[2] One school served only Grade 2 students.

The achievement growth of HOSTS students in 1981-82 was compared with their achievement growth in 1980-81. The results show HOSTS students made larger gains in 1981-82 as compared to 1980-81. Next, the difference in achievement growth made in 1981-82 compared to 1980-81 for a two-year matched group (i.e., students who had Fall and Spring test sores for 1980-81 and 1981-82) was calculated. This requires further explanation. The achievement growth for 1980-81 is subtracted from the achievement growth for 1981-82. For example, if students showed an achievement growth of .30 deviations in 1981-82 and an achievement growth of .20 deviations in 1980-81, then the difference in achievement growth made in 1980-81 compared to 1981-82 is .10 (i.e., .30 - .20). Similarly, if students showed an ahievement growth of .30 deviations in 1981-82 and an achievement growth of -.20 deviations, then the difference in achievement growth made in 1980-81 compared to 1981-82 is .50 (i.e., .30 - [-20]). It is hypothesized the difference in achievement growth over two years can be attributed to the effects of the instructional program. After the difference in achievement growth is determined, it is finally compared to the District's achievement growth for the same two years in order to determine significance.

The difference in achievement growth made in 1981-82 compared to 1980-81 was calculated for a two-year matched growth of students in reading and mathematics. The results show HOSTS students made gains approaching significance from 1980-81 to 1981-82 while non-HOSTS showed no change in achievement growth and District Title I students made a small, non-significant gain.

First- and Third-Year Schools

In order to determine if experience with the program might enable schools to produce larger gains, comparisons were made between schools with one year of experience with HOSTS and those with three years of experience.

Table VII shows clear and intact deviation means for first- and third-year schools. Data were available for three third-year and twelve first-year schools. As a group, students in third-year schools had a slightly larger gain than those in first-year schools; however, only one third-year school had a gain larger than the average of the first-year schools.

In summary, the data for grades 3-8 show:

- HOSTS students tend to be the lower performing students.
- Overall, HOSTS students made slightly larger gains than non-HOSTS and District Title I students in 1981-82. By grades, HOSTS students made equivalent gains to non-HOSTS and District Title I students in grades 4 and 6, and smaller gain in grade 3, and a considerably larger gain in grade 5. The sample size for grades 7 and 8 was too small to interpret.
- The average gain of third-year schools was slightly larger than first-year schools. However, the gain of only one third-year school was larger than the average of the first-year schools.

- Achievement growth for HOSTS students for 1981-82 was compared with the achievement growth in 1980-81. The results show HOSTS students made gains in 1981-82 as compared to losses in 1980-81.

- When data on the difference in achievement growth made in 1980-81 compared to 1981-82 based on a two-year matched group are examined, the results indicate HOSTS students made a gain approaching significant growth in reading, while non-HOSTS students showed no change in achievement growth and District Title I students made a small non-significant gain.

VARIABLES

The evaluation investigated the relationship between student achievement and three variables: type of tutor, subject students missed to attend HOSTS, and time (number of weeks) in the program.

TUTOR

Schools were asked to keep records on the type of tutor instructing each HOSTS student. Tutors were classified into six categories; Community Member, College student, High School student, Cross-Age student, Teaching Staff (including aides) and a 'mixed' category which indicated that a student had more than one type of tutor. The categories mean students were instructed by the same type of tutor, but it does not mean that the same tutor worked with the student every day. In fact, most students were instructed by different tutors every day. The number of college and high school tutors was small, so their data was eliminated from the analysis.

The data are presented in the same format as the data for grades 3-8. Tables VIII and IX show the RIT and standard deviation means for HOSTS students by tutor and by grade. Overall, the total group deviations in Table IX show Community Members tended to be placed with the higher performing HOSTS students. Lower performing students tended to be placed with the three other groups. All groups, except the group tutored by mixed tutors, made larger gains than the District average for 1981-82; however, students with cross-age or staff tutors made the largest gains. An analysis of tutor effect for the 1981-82 data by grades is impractical due to the small number of cases in some groups.

Data for this year's HOSTS students from 1980-81 show students who had community members and staff tutors in 1981-82 lost in relative position in the District in 1980-81. Students who had mixed tutors in 1981-82 maintained their relative position in the District in 1980-81 and 1981-82. Insufficient data was available in 1980-81 for students with cross-age tutors.

The difference in achievement growth made in 1981-82 compared to 1980-81 for students in the tutor groups was calculated for a two-year matched group. The results show students who had staff tutors made significant gains at the .05 level from one year to the next while students who had community members or mixed tutors made small non-significant gains; however, the results for students with mixed tutors should be interpreted with caution due to a small sample size. The sample size for students with cross-age tutors is too small to interpret.

The data on tutors show:

- In 1981-82, students who had cross-age, staff, and community member made larger gains than the District average. Students who had staff and cross-age tutors had larger gains than students having either community member or mixed tutors. Students who had mixed tutors show no gain over the District averages.

- When data on the difference in achievement growth made in 1980-81 was compared to 1981-82, based on a two-year matched group, are examined, the results show students who had staff tutors made a significant gain in achievement growth from one year to the next, while students who had community members or mixed tutors made small, non-significant gains. The sample size for students with cross-age tutors was too small to interpret.

SUBJECT MISSED

Schools identified and classified the subject students missed into five categories; reading instruction, reading seatwork, mathematics, language arts, and other. The number of students who missed reading instruction was small and their data was eliminated from the analysis.

Tables X and XI show RIT and standard deviation means for subject missed by grade over the last two years. Overall, the 1981-82 results showed students who missed 'other' subjects made larger gains than students who missed reading seatwork and language arts. The number of students who missed math was too small to interpret. An analysis of subject missed for the 1981-82 data by grades was impractical due to the small number of cases in groups.

The total group deviation results from 1980-81 shows students who missed reading seatwork lost in relative position with respect to the District, while students who missed language arts or 'other' subjects maintained their relative position. Insufficient 1980-81 data was available for students who missed math.

The difference in achievement growth from 1980-81 compared to 1981-82 for students in subject missed groups was not conducted since meaningful comparisons could not be made due to the small sample sizes in two of the four groups.

In summary, the data for subjects missed shows:

- HOSTS students who missed 'other' subjects had larger gains in reading than students who missed reading or language arts in 1981-82. The sample size for students who missed mathematics was too small to interpret.

TIME

The third variable was time in the program. First, a correlation was performed on the data between time in the program and reading gain. The correlation indicated no significant correlation ($r = -.10$) between time and reading gain. Students were then divided into three groups (16-22 weeks, 23-27 weeks and 28-31 weeks) to determine if students enrolled in HOSTS for a longer period had larger gains than students in a shorter period.

Tables XII and XIII show the RIT and standard deviation means for HOSTS students by time by grade over the last two years. Overall, the totals for 1981-82 in Table XII show students who were in the program for the 16-22 weeks interval had larger gains than students enrolled in the longer intervals.

A possible explanation of the result that students in the program for a shorter time made larger gains than students enrolled for a longer period is that the HOSTS program motivates students to become more interested in reading. The reasoning is the HOSTS experience is new and exciting which creates student interest. This initial interest motivates the students to learn the instructional materials, which, in turn produces higher test scores; however, once the novelty wears off, so does the motivation and learning. This explanation would account for why HOSTS students had larger gains than other Title I students and why HOSTS students who were in the program for longer time intervals did not have larger gains than students in for a shorter period.

Further investigation of the data revealed another possible explanation. Although the number of schools represented in each time interval is essentially equivalent, the number of students per school is not divided equally among the time intervals. The result is that a particular time interval may be over-represented by a few schools. In fact, three schools represented 57 percent of the students in the 23-27 weeks interval and six schools represented 86 percent of the students in the 28-31 weeks interval. The 16-22 weeks interval was more equally represented by all schools. The six schools having a majority of their students in the 28-31 weeks interval had overall smaller gains than the three schools having a majority of the students in the 23-27 weeks interval. It appears that generally low achieving schools were over-represented in the longer time interval. At this time, it is difficult to determine if the larger gains of students in the program for shorter intervals are actually related to time in the program or to school differences. Further research is needed in this area.

The difference in achievement from 1980-81 compared to 1981-82 for the three time intervals was not conducted because, at this time, it is difficult to rule out a school effect from time in the program.

The data for time in the program show:

- The Pearson correlation indicated no significant correlation ($r = -.10$) between time in the program and reading gain.
- The 1981-82 results show students who were in the program for the 16-22 weeks interval had larger gains than students enrolled for the longer interval periods. However, it is not clear if the difference in gains is due to a novelty effect (i.e., a program is optimally effective for the shorter interval) or due to school differences (i.e., the fact that generally low achieving schools were over-represented in the longer time intervals). At this time it is difficult to rule out school effect.

CONCLUSIONS AND RECOMMENDATIONS

Students in HOSTS for 16 weeks or more had slightly larger gains than overall District Title I students in 1981-82 as indicated by Portland citywide achievement test results. Data on the difference in achievement growth made in 1980-81 compared to 1981-82 indicate HOSTS students made a gain approaching significance for reading. Based on the evaluation data, it is recommended that the District give serious consideration to the continued implementation of the HOSTS program within the guidelines established by the program and that schools and administrators continue to ensure accurate identification and collection of information necessary for evaluation. In addition, a systematic investigation of effective HOSTS schools should be conducted in order to identify promising practices and variables so that they can be disseminated to other HOSTS schools for possible action.

TABLE V

RIT Score Means for HOSTS, Non-HOSTS, District Title I*, and District Students for 1980-81 and 1981-82 by Grade

	N	Fall 1980	Spring 1981	Difference
Grade 3				
HOSTS	55	165.5	170.6	5.1
Non-HOSTS	32	171.4	178.2	6.8
Title I, Dist.	344	169.5	176.0	6.5
District	2545	187.0	193.6	6.6
Grade 4				
HOSTS	45	177.0	179.1	2.1
Non-HOSTS	39	181.1	182.4	1.3
Title I, Dist.	350	179.8	182.3	2.5
District	2816	195.7	200.7	5.0
Grade 5				
HOSTS	19	188.3	190.4	2.1
Non-HOSTS	2	-	-	-
Title I, Dist.	358	185.4	188.5	3.1
District	3055	202.6	207.3	4.7
Grade 6				
HOSTS	7	-	-	-
Non-HOSTS	0	-	-	-
Title I, Dist.	343	191.7	194.5	2.8
District	3031	208.8	213.0	4.2
Grade 7				
HOSTS	8	-	-	-
Non-HOSTS	0	-	-	-
Title I, Dist.	289	194.9	197.1	2.2
District	2880	213.9	217.2	3.3
Grade 3				
HOSTS	99	167.9	176.3	8.4
Non-HOSTS	50	170.7	179.3	8.6
Title I, Dist.	516	169.6	179.1	9.5
District	2940	187.2	193.3	6.1
Grade 4				
HOSTS	68	175.3	183.6	8.3
Non-HOSTS	45	175.1	183.3	8.2
Title I, Dist.	442	178.1	186.3	8.2
District	3001	195.8	201.1	5.3
Grade 5				
HOSTS	57	180.3	192.0	10.9
Non-HOSTS	42	186.1	192.1	6.0
Title I, Dist.	436	184.1	191.8	7.7
District	3222	203.2	207.4	4.2
Grade 6				
HOSTS	25	191.3	196.8	5.5
Non-HOSTS	3	-	-	-
Title I, Dist.	442	191.4	196.7	5.3
District	3416	209.8	213.0	3.2
Grade 7				
HOSTS	7	-	-	-
Non-HOSTS	0	-	-	-
Title I, Dist.	393	196.4	199.6	3.2
District	3320	215.2	217.4	2.2
Grade 8				
HOSTS	9	-	-	-
Non-HOSTS	0	-	-	-
Title I, Dist.	329	201.0	203.9	2.9
District	3127	219.4	222.0	2.6

* The data for District Title I students are for clear and intact groups. These numbers differ slightly from those reported in the Administrative Summary which was based on clear groups; however, the interpretation is the same.

TABLE VI

Standard Deviation Means for HOSTS, Non-HOSTS, District Title I, and District Students for 1980-81 and 1981-82 by Grade

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference	N	Rate
					Grade 3						
					HOSTS	99	-2.91	-2.75	.16	3	-
					Non-HOSTS	50	-2.48	-2.26	.22	0	-
					Title I, Dist.	516	-2.65	-2.30	.35	10	0.40
					District	2940	0.00	0.03	.03	All	0.00
Grade 3					Grade 4						
HOSTS	55	-3.06	-3.48	-.42	HOSTS	68	-3.28	-3.00	.28	49	0.57
Non-HOSTS	32	-2.18	-2.26	-.08	Non-HOSTS	45	-3.31	-3.06	.25	30	0.26
Title I, Dist.	344	-2.52	-2.62	-.10	Title I, Dist.	442	-2.83	-2.54	.29	321	0.33
District	2545	0.18	0.22	.04	District	3001	0.02	-0.01	-.01	All	0.00
Grade 4					Grade 5						
HOSTS	45	-3.36	-3.38	-.02	HOSTS	57	-3.79	-2.67	1.12	39	1.18
Non-HOSTS	39	-2.53	-2.82	-.29	Non-HOSTS	42	-2.82	-2.66	.16	33	0.06
Title I, Dist.	350	-2.78	-2.84	-.06	Title I, Dist.	436	-3.16	-2.71	.45	318	0.42
District	2816	0.11	0.10	-.01	District	3222	0.02	0.01	-.01	All	0.00
Grade 5					Grade 6						
HOSTS	19	-2.11	-2.28	-.17	HOSTS	25	-2.97	-2.69	.22	18	0.44
Non-HOSTS	2	-	-	-	Non-HOSTS	3	-	-	-	1	-
Title I, Dist.	358	-2.57	-2.56	-.01	Title I, Dist.	442	-2.96	-2.71	.25	344	0.16
District	3055	0.12	0.14	.02	District	3416	-0.02	-0.05	-.03	All	0.00
Grade 6					Grade 7						
HOSTS	7	-	-	-	HOSTS	7	-	-	-	7	-
Non-HOSTS	0	-	-	-	Non-HOSTS	0	-	-	-	0	-
Title I, Dist.	343	-2.61	-2.72	-.11	Title I, Dist.	393	-3.07	-2.85	.22	308	0.24
District	3031	0.16	0.18	.02	District	3320	0.07	0.02	-.05	All	0.00
Grade 7					Grade 8						
HOSTS	8	-	-	-	HOSTS	9	-	-	-	8	-
Non-HOSTS	0	-	-	-	Non-HOSTS	0	-	-	-	0	-
Title I, Dist.	289	-2.67	-2.95	-.32	Title I, Dist.	329	-2.97	-2.90	.07	262	0.26
District	2880	0.20	.19	-.01	District	3127	0.09	0.04	-.05	All	0.00
TOTALS											
HOSTS	136	-2.96	-3.17	-.21	HOSTS	265	-3.16	-2.75	.40	124	0.72
Non-HOSTS	73	-2.42	-2.64	-.22	Non-HOSTS	140	-2.90	-2.68	.22	64	0.16
Title I, Dist.	1684	-2.63	-2.73	-.10	Title I, Dist.	2558	-2.93	-2.65	.28	1560	0.28
District	14327	.15	.16	.01	District	19026	0.03	0.01	-.02	All	0.00

TABLE VII

Standard Deviation Means for First- and Third-Year HOSTS Students for 1980-81 and 1981-82

GROUP	N	Fall 1980	Spring 1981	Difference	N	Fall 1981	Spring 1982	Difference
First Year	105	-2.86	-2.91	-.05	210	-3.08	-2.71	.37
Third Year	31	-3.29	-4.05	-.76	55	-3.46	-2.92	.54
TOTAL HOSTS	136	-2.96	-3.17	-.21	265	-3.16	-2.75	.41

TABLE VIII

RIT Score Means for HOSTS Students for 1980-81 and 1981-82 by Tutor

Grade Tutor	N	Fall 1980	Spring 1981	Difference
Grade 3				
Com. Member	31	166.7	171.9	5.2
Cross Age	2	-	-	-
Staff	14	161.9	165.9	4.0
Mixed	7	-	-	
Grade 4				
Com. Member	16	174.9	176.2	1.3
Cross Age	4	-	-	-
Staff	14	176.8	176.8	0.0
Mixed	11	178.4	184.9	6.5
Grade 5				
Com. Member	8	-	-	
Cross Age	2	-	-	
Staff	1	-	-	
Mixed	8	-	-	
Grade 6				
Com. Member	4	-	-	
Cross Age	-	-	-	
Staff	2	-	-	
Mixed	1	-	-	
Grade 7				
Com. Member	6	-	-	
Cross Age	-	-	-	
Staff	2	-	-	
Mixed	-	-	-	

Grade Tutor	N	Fall 1981	Spring 1982	Difference
Grade 3				
Com. Member	38	169.9	180.1	10.2
Cross Age	22	167.8	177.4	9.6
Staff	13	170.3	173.3	3.0
Mixed	31	164.5	171.8	7.3
Grade 4				
Com. Member	37	178.5	185.3	6.8
Cross Age	3	-	-	-
Staff	18	172.4	195.9	23.5
Mixed	10	170.3	174.9	4.6
Grade 5				
Com. Member	24	180.2	189.6	9.4
Cross Age	7	-	-	-
Staff	17	181.2	194.5	13.3
Mixed	9	-	-	-
Grade 6				
Com. Member	11	187.9	192.4	4.5
Cross Age	2	-	-	-
Staff	2	-	-	-
Mixed	10	193.9	199.7	5.8
Grade 7				
Com. Member	4	-	-	
Cross Age	-	-	-	
Staff	2	-	-	
Mixed	-	-	-	
Grade 8				
Com. Member	7	-	-	
Cross Age	-	-	-	
Staff	2	-	-	
Mixed	-	-	-	

TABLE IX

Standard Deviation Means for HOSTS Students for 1980-81 and 1981-81 by Tutor

Grade Tutor	N	Fall 1980	Spring 1981	Difference	Grade Tutor	N	Fall 1981	Spring 1982	Difference	N	Rate
					Grade 3						
					Com. Member	38	-2.60	-2.12	.48	2	-
					Cross Age	22	-2.96	-2.57	.39	0	-
					Staff	8	-	-	-	0	-
					Mixed	31	-3.41	-3.48	-.07	1	-
Grade 3					Grade 4						
Com. Member	31	-2.86	-3.17	-.31	Com. Member	37	-2.76	-2.71	-.06	27	0.31
Cross Age	2	-	-	-	Cross Age	3	-	-	-	2	-
Staff	14	-3.62	-4.19	-.57	Staff	18	-3.75	-2.60	1.15	13	-
Mixed	7	-	-	-	Mixed	10	-4.08	-4.49	-.39	7	-
Grade 4					Grade 5						
Com. Member	16	-3.79	-3.95	-.16	Com. Member	24	-3.82	-3.10	.72	15	-
Cross Age	4	-	-	-	Cross Age	7	-	-	-	4	-
Staff	14	-3.32	-3.72	-.40	Staff	17	-3.64	-2.25	1.39	13	-
Mixed	11	-3.14	-2.41	-.73	Mixed	9	-	-	-	7	-
Grade 5					Grade 6						
Com. Member	8	-	-	-	Com. Member	11	-3.51	-3.42	.09	8	-
Cross Age	2	-	-	-	Cross Age	2	-	-	-	2	-
Staff	1	-	-		Staff	2	-	-	-	1	-
Mixed	8	-	-		Mixed	10	-2.56	-2.22	.34	7	-
Grade 6					Grade 7						
Com. Member	4	-	-		Com. Member	4	-	-	-	4	-
Cross Age	-	-	-		Cross Age	-	-	-	-	0	-
Staff	2	-	-		Staff	2	-	-	-	2	-
Mixed	1	-	-		Mixed	1	-	-	-	1	-
Grade 7					Grade 8						
Com. Member	6	-	-		Com. Member	7	-	-	-	6	-
Cross Age	-	-	-		Cross Age	1	-	-	-	0	-
Staff	2	-	-		Staff	2	-	-	-	2	-
Mixed	-	-	-		Mixed	-	-	-	-	0	-
TOTALS											
Com. Member	67	-2.91	-3.17	-.27	Com. Member	121	-2.92	-2.56	.36	62	0.59
Cross Age	8	-	-	-	Cross Age	34	-3.40	-2.65	.75	8	-
Staff	33	-3.48	-3.84	-.35	Staff	49	-3.36	-2.63	.74	31	1.23
Mixed	28	-2.51	-2.52	-.00	Mixed	61	-3.33	-3.30	-.03	23	0.41

TABLE X

RIT Score Means for HOSTS Students for 1980-81 and 1981-82 by Subject Missed

Grade Subject	N	Fall 1980	Spring 1981	Difference	Grade Subject	N	Fall 1981	Spring 1982	Difference
					Grade 3				
					Read	28	169.8	177.7	7.9
					Math	7	-	-	-
					L. Arts	36	168.5	176.1	7.6
					Other	28	168.1	177.2	9.1
Grade 3					Grade 4				
Read	9	-	-	-	Read	10	174.2	185.9	11.7
Math	1	-	-	-	Math	2	-	-	-
L. Arts	16	166.8	171.7	4.9	L. Arts	22	173.1	180.2	7.1
Other	28	163.9	170.9	7.0	Other	34	176.6	185.3	8.7
Grade 4					Grade 5				
Read	2	-	-	-	Read	3	-	-	-
Math	-	-	-	-	Math	2	-	-	-
L. Arts	14	174.4	178.0	3.6	L. Arts	16	179.4	189.4	10.0
Other	26	178.1	179.8	1.7	Other	36	181.4	192.9	11.5
Grade 5					Grade 6				
Read	-	-	-	-	Read	-	-	-	-
Math	-	-	-	-	Math	-	-	-	-
L. Arts	10	192.9	194.5	1.6	L. Arts	12	194.3	198.9	4.6
Other	9	-	-	-	Other	13	188.5	194.9	6.4
Grade 6					Grade 7				
Read	-	-	-	-	Read	-	-	-	-
Math	-	-	-	-	Math	-	-	-	-
L. Arts	4	-	-	-	L. Arts	4	-	-	-
Other	3	-	-	-	Other	3	-	-	-
Grade 7					Grade 8				
Read	2	-	-	-	Read	2	-	-	-
Math	-	-	-	-	Math	-	-	-	-
L. Arts	6	-	-	-	L. Arts	7	-	-	-
Other	-	-	-	-	Other	-	-	-	-

TABLE XI

Standard Deviation Means for HOSTS Students for 1980-81 & 1981-82 by Subject Missed

Grade Subject	N	Fall 1980	Spring 1981	Difference	Grade Subject	N	Fall 1981	Spring 1982	Difference
					Grade 3				
					Read	28	-2.62	-2.52	.10
					Math	7	-	-	-
					L. Arts	36	-2.81	-2.79	.02
					Other	28	-2.87	-2.60	.27
Grade 3					Grade 4				
Read	9	-	-	-	Read	10	-3.46	-2.61	.85
Math	1	-	-	-	Math	2	-	-	-
L. Arts	16	-3.02	-3.35	-.33	L. Arts	22	-3.64	-3.58	.06
Other	28	-3.40	-3.44	-.04	Other	34	-3.07	2.71	.36
Grade 4					Grade 5				
Read	2	-	-	-	Read	3	-	-	-
Math	3	-	-	-	Math	2	-	-	-
L. Arts	14	-3.74	3.52	.22	L. Arts	16	-3.94	-3.14	.80
Other	26	-3.08	-3.24	-.16	Other	36	-3.60	-2.52	1.08
Grade 5					Grade 6				
Read	-	-	-	-	Read	-	-	-	-
Math	-	-	-		Math	-	-	-	-
L. Arts	10	1.40	1.69	-.29	L. Arts	12	-2.49	-2.35	.14
Other	9	-	-	-	Other	13	-3.41	-3.00	.41
Grade 6					Grade 7				
Read	-	-	-	-	Read	-	-	-	-
Math	-	-	-	-	Math	-	-	-	-
L. Arts	4	-	-	-	L. Arts	4	-	-	-
Other	3	-	-	-	Other	3	-	-	-
Grade 7					Grade 8				
Read	2	-	-	-	Read	2	-	-	-
Math	-	-	-	-	Math	-	-	-	-
L. Arts	6	-	-	-	L. Arts	7	-	-	-
Other	-	-	-	-	Other	-	-	-	-
TOTALS									
Reading	16	-2.88	-3.72	-.84	Read	43	-2.88	-2.52	.35
Math	4	-	-	-	Math	11	-	-	-
L. Arts	50	-2.66	-2.81	-.14	L. Arts	97	-3.05	-2.85	.22
Other	66	-3.20	-3.29	-.09	Other	114	-3.22	-2.67	.54

TABLE XII

RIT Score Means for HOSTS Students for 1980-81 & 1981-82 by Time

Grade Subject	N	Fall 1980	Spring 1981	Difference	Grade Subject	N	Fall 1981	Spring 1982	Difference
					Grade 3				
					16-22	25	166.4	177.8	11.4
					23-27	39	164.6	175.4	10.8
					28-31	35	172.6	176.1	3.5
Grade 3					Grade 4				
16-22	5	-	-	-	16-22	6	-	-	-
23-27	24	163.7	168.6	4.9	23-27	31	175.7	184.6	9.1
28-31	25	167.6	173.0	5.4	28-31	31	175.5	183.2	7.7
Grade 4					Grade 5				
16-22	15	183.3	185.5	2.2	16-22	16	184.9	196.8	11.9
23-27	9	-	-	-	23-27	13	179.1	186.0	6.9
28-31	21	173.8	174.8	1.0	28-31	28	178.3	192.1	13.8
Grade 5					Grade 6				
16-22	8	-	-	-	16-22	9	-	-	-
23-27	3	-	-	-	23-27	5	-	-	-
28-31	8	-	-	-	28-31	11	189.0	194.3	5.3
Grade 6					Grade 7				
16-22	-	-	-	-	16-22	-	-	-	-
23-27	3	-	-	-	23-27	3	-	-	-
28-31	4	-	-	-	28-31	4	-	-	-
Grade 7					Grade 8				
16-22		-	-	-	16-22	-	-	-	-
23-27	6	-	-	-	23-27	7	-	-	-
28-31	2	-	-	-	28-31	2	-	-	-

TABLE XIII

Standard Deviation Means for HOSTS Students for 1980-81 & 1981-82 by Time

Grade Subject	N	Fall 1980	Spring 1981	Difference	Grade Subject	N	Fall 1981	Spring 1982	Difference
					Grade 3				
					16-22	25	-3.13	-2.50	.63
					23-27	39	-3.39	-2.90	.49
					28-31	36	-2.24	-2.77	-.53
Grade 3					Grade 4				
16-22	5	-	-	-	16-22	6	-	-	-
23-27	24	-3.35	-3.75		23-27	31	-3.22	-2.83	.39
28-31	26	-2.74	-3.15		28-31	31	-3.24	-3.08	.16
Grade 4					Grade 5				
16-22	15	-2.13	-2.33		16-22	16	-3.03	-1.84	1.19
23-27	9	-	-	-	23-27	13	-4.00	-3.72	.28
28-31	23	-3.97	-4.06		28-31	28	-4.13	-2.66	1.45
Grade 5					Grade 6				
16-22	8	-	-	-	16-22	9	-	-	
23-27	3	-	-	-	23-27	5	-	-	
28-31	8	-	-	-	28-31	11	-3.33	-3.11	.20
Grade 6					Grade 7				
16-22	-	-	-		16-22	-	-	-	
23-27	3	-	-		23-27	3	-	-	
28-31	4	-	-		28-31	4	-	-	
Grade 7					Grade 8				
16-22	-	-	-	-	16-22	-	-	-	
23-27	6	-	-		23-27	7	-	-	
28-31	2	-	-		28-31	2	-	-	
TOTALS									
16-22	28	-2.06	-2.29	-.23		56	-3.07	-2.30	.77
23-27	45	-3.07	-3.27	-.20		98	-3.26	-2.89	.37
28-31	63	-3.28	-3.49	-.21		111	-3.11	-2.87	.24

ADDENDUM

EFFECT OF TUTORING ON THE TUTOR'S OWN ACHIEVEMENT[1]

A total of 356 cross-age students, or 40 percent of the tutor population, was used as tutors in 20 of the 22 HOSTS schools. Most of them were enrolled in HOSTS schools, although some came from neighboring schools (Kellogg, Hosford, Fernwood and Tubman). The student tutors ranged in grade level from fourth through eighth. They volunteered 1/2 to 2 1/2 hours per week. Students were selected as tutors based on a variety of criteria some of which were teacher recommendation, their ability to work successfully with younger children, and schedule permissibility. Each tutor received approximately one hour of preservice instruction and one-half to one hour of watching a reading specialist model appropriate tutored skills with a HOSTS student. Some schools provided additional training and all schools provided ongoing supervision. The tutors communicated daily with the Title I teacher on the tutee's progress.

At the end of the 1981-82 school year, schools provided identification information on 296 of the 356 cross-age tutors. Data on the other 60 students were not available at the time of the evaluation. The effect of tutoring on the tutor's own achievement was assessed by fall and spring administration of the Portland Achievement Levels Test in reading and language usage. It was expected, since HOSTS is primarily a reading program, the reading achievement scores would be most influenced. The language arts scores are included only secondarily because of the general skills that both reading and language usage share. Pre- and post-test data were available for 256 tutors in reading and 246 in language usage. The fall and spring means for all District students are included for comparison purposes.

Data for student tutors are presented in Tables I - IV. Tables I and II show the RIT means of tutors and District students for reading and language usage respectively, while Tables III and IV show the RIT means in standard deviation scores. All data are for clear and intact groups.

The 1981-82 reading results show that cross-age tutors tend to be the better performing students. Overall, the total group deviations in Table III showed cross-age tutors appeared to gain slightly less in reading than District students. Part of the loss may be due to the effects of regression since cross-age tutors are higher performing students.

An analysis of the reading results by grade shows cross-age tutors in grades 4 and 5 appeared to lose more than grades 6 and 7, while cross-age tutors in Grade 8 showed some gain. The larger loss of cross-age tutors in Grades 4 and 5 may, in part, be due to regression since they are the higher performing tutors.

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[1] This section of the report was completed by Joan Williams, a graduate student at Lewis and Clark College.

The 1981-82 language usage results are similar to the reading results. The total group deviations in Table IV show cross-age tutors are higher performing than District students. Overall, the results show cross-age tutors gained considerably less than District students. A by-grades analysis does not reveal the trend found in reading: larger losses at the lower grades. Rather, there are large losses in relative position at all grade levels, except Grade 5. As in reading, a part of the large loss in language usage may be due to the effects of regression. The effect may be even more so in language usage than reading since the deviation scores indicate tutors had higher fall test scores in language usage than reading.

The data for student tutors show:

- o In 1981-82, student tutors gained slightly less than District students in reading and considerably less in language usage.

TABLE I

RIT Score Means for HOSTS Tutors and District Students for 1981-82 - by Grade

GRADE	GROUP	N	FALL 81	SPRING '82	GAINS
4	Tutors	20	209.2	211.4	2.2
	District	3001	195.8	201.1	+5.3
5	Tutors	62	211.7	213.1	+1.4
	District	3222	203.2	207.4	+5.2
6	Tutors	35	211.8	214.6	+2.8
	District	3416	209.8	213.0	+3.2
7	Tutors	76	219.8	221.6	+1.8
	District	3320	215.2	217.4	+2.2
8	Tutors	63	218.7	223.5	+4.6
	District	3127	219.4	222.0	+2.8

TABLE II

Language Usage RIT Score Means for HOSTS Tutors and District Students for 1981-82 by Grade

GRADE	GROUP	N	FALL '81	SPRING '82	GAINS
4	Tutors	20	207.55	210.55	3.00
	District	2980	196.2	202.4	6.2
5	Tutors	61	209.87	213.74	3.87
	District	3214	203.0	207.5	4.5
6	Tutors	36	211.86	213.81	1.95
	District	3372	208.6	211.8	3.2
7	Tutors	75	218.09	219.40	1.31
	District	3320	212.5	215.5	3.0
8	Tutors	62	216.37	216.66	0.29
	District	3135	215.4	218.3	2.9

TABLE III

Reading Standard Deviation Means for HOSTS Tutors and District Students by Grade

GRADE	GROUP	N	FALL '81	SPRING '82	DIFF.
4	Tutors	20	2.18	1.75	-0.43
	District	3001	0.02	0.01	-0.01
5	Tutors	62	1.44	1.01	-0.43
	District	3222	0.02	0.01	-0.01
6	Tutors	35	0.30	0.21	-0.09
	District	3416	-0.02	-0.05	-0.03
7	Tutors	76	0.84	0.69	-0.15
	District	3320	0.07	0.02	-0.05
8	Tutors	63	0.01	0.29	0.28
	District	3127	0.09	0.04	-0.05
TOTALS	Tutors	256	0.81	0.69	-0.12
	District	19026	0.03	0.01	-0.02

TABLE IV

Language Arts Standard Deviation Means for HOSTS Tutors and District Students by Grade

GRADE	GROUP	N	FALL '81	SPRING '82	DIFF.
4	Tutors	20	2.24	1.51	-0.73
	District	2980	0.02	0.01	-0.01
5	Tutors	61	1.32	1.22	-0.10
	District	3214	0.03	0.03	0.00
6	Tutors	36	1.82	0.36	-1.46
	District	3372	0.03	-0.02	-0.05
7	Tutors	75	1.27	0.72	-0.55
	District	3320	0.09	0.01	-0.08
8	Tutors	62	0.55	-0.27	-0.82
	District	3135	0.09	0.00	-0.09
TOTALS	Tutors	246	1.30	0.63	-0.67
	District	16021	0.05	0.01	-0.04

EVALUATION REPORT

ON

PRESCRIPTION LEARNING

November 1982

David Leitner

Portland Public Schools

4135a

PRESCRIPTION LEARNING

Prescription Learning is a multi-media instructional program adopted by five elementary schools (George, Kellogg, Ockley Green, Sellwood and Whitaker) and one high school (Grant)* in the Portland School District. All six schools are Title I schools and adopted Prescription Learning to provide supplemental reading and math instruction to low-performing students. A total of 529 students received services: 434 students in reading and 446 in mathematics.

Prescription Learning is a diagnostic, prescriptive program that provides individualized instruction through the use of six instructional strategies. The diagnostic, prescriptive and instructional procedures used in Prescription Learning were specified by program guidelines and were essentially identical for all schools. Prescription Learning students were initially administered the Plasment Test at the beginning of the year. It provided a Starter Prescription that placed students in the appropriate level in a skill continuum and specified which skills in the continuum the student needed to master. A more detailed Individual Prescription, also based on results from the Plasment Test, was sent from Prescription Learning Corporation to the schools in about two weeks. Students worked on the Starter Prescription until the Individual Prescription arrived.

The Individual Prescription specified at least four skill areas, the objectives in the skill areas, and the instructional strategies for each objective not yet mastered. Students received a copy of the prescription and were either directed into an instructional strategy or permitted to choose the instructional strategy with which to start. Students usually completed all instructional strategies in each objective before taking a "hands-on" test which measured those objectives the student had yet to master. The results from the "hands-on" test updated the student's Individual Prescription.

Throughout the program students progressed in the skills continuum by showing mastery on the "hands-on" tests. When all objectives for a continuum were met, the student moved into the next continuum. If a student failed to master a skill after two testings, the student was placed in Teacher Directed Activity. If students failed a third time, they were recycled back into the initial materials. The assessment and prescriptive process was repeated whenever necessary. The six instructional strategies employed by Prescription Learning were: computer-assisted instruction, card readers, film strips, audio machines, workbooks, and teacher-directed activity.

* The Grant Prescription Learning program started in January, 1982 and is not included in the following descriptive and evaluative information. An evaluation of the Grant program will be completed for 1982-83.

PRESCRIPTION LEARNING CHARACTERISTICS

Student Selection

Students were selected for the Prescription Learning program based on Title I eligibility requirements (i.e., a P-score of 43 or below and/or teacher judgment). Whitaker used the additional requirement of placing the higher Title I students in Prescription Learning while the lower students were placed in the Educational Developmental Laboratory (EDL), another learning program.

Grades Served and Number of Students

The Prescription Learning program served students in Grades 4-8, however most students were in Grades 6-8. A total of 529 students received services in Prescription Learning: 434 students in reading and 446 in math (See Table I).

TABLE I

PRESCRIPTION LEARNING SCHOOLS, GRADES
and NUMBER OF STUDENTS

SCHOOLS	GRADES	NUMBER OF STUDENTS	NUMBER OF READING STUDENTS	NUMBER OF MATH STUDENTS
George	4-8	93	93	93
Kellogg	6-8	118	112	115
Ockley Green	6-8	119	115	119
Sellwood	5-8	127	85	74
Whitaker*	7-8	72	29	45
		529	434	446

*The total number of students served in the Whitaker Prescription Learning program was 144: 116 students in reading and 58 in mathematics. Many students attended the PL program for only one or two quarters and also received instruction in the Educational Developmental Laboratory (EDL). These students are not included in Table I. Table I figures include students who were in PL for at least three school quarters in either reading or mathematics.

Staff

Each school Prescription Learning program was staffed by a minimum of one full-time teacher and aide. Table II shows the number and FTE of teachers and aides per school.

TABLE II

Number and FTE of Teachers
and Aides in Prescription Learning Schools

School	Teacher		Aides	
	Number	FTE	Number	FTE*
George	1	1	1	.5
Kellogg	1	1	3	1.2
Ockley Green	1	1	1	.5
Sellwood	2	1.5	3	1.5
Whitaker	1	1	1	.5

*The formula used to determine Aide FTE was 7 hrs. = .5 FTE

Training

The Prescription Learning Corporation provided 2 days of initial training for teachers and aides at the beginning of the school year. The initial training was followed by a one day on-site training session. Afterwards, the Area Director or Technical Consultant from Prescription Learning provided weekly on-site visitations to review diagnostic and prescriptive procedures and answer questions. In addition, the Prescription Learning Corporation provided two workshops; one in the fall and one in the spring.

EVALUATION

An evaluation was conducted to investigate the effects of the Prescription Learning program. It compared the gains of Title I students who were in Prescription Learning with District Title I students, and all District students. Next, the achievement growth of Prescription Learning students in 1981-82 was compared with their achievement growth in 1980-81. Student achievement was assessed by Fall and Spring administrations of the Portland Achievement Levels Tests in reading and mathematics.

The evaluation also investigated the relationship between student achievement and three variables: weeks in the program, minutes per week in the program, and the subject students missed by attending Prescription Learning. The data are presented according to the following sections: (1) grades 4-8; and (2) relationships between student achievement and variables of weeks in the program, minutes per week in the program, and subject missed.

GRADES 4-8

Student achievement was measured by fall and spring administration of the Portland Achievement Levels Test in reading and math. The results are reported in Rasch Calibrated Units (RIT scores) and standard deviation units. RIT scores are based on an equal interval scale that ranges from 140-280 and represent how well a student is achieving in the Portland curriculum from grades 3-8. The standard deviation units represent how much the RIT mean deviates from the District average. They range from a +3 to a -3.

The data includes students from five Prescription Learning schools who were in the program a minimum of 16 weeks. This represents half of the time between the beginning of school to the post-test date. Students in the program less than 16 weeks were not in the tables but their results are mentioned in this section of the report.

The data are presented in four tables: Tables III and V show reading and math RIT means and Tables IV and VI show the RIT means in standard deviation scores. The reading data are for students who received reading instruction in Prescription Learning and the math data are for students who received math instruction. Most students received reading and math instruction. All tables show clear and intact group means for Prescription Learning, District Title I, and District students for 1980-81 and 1981-82 by grade. In addition, Tables IV and VI show the total group standard deviation means of students summed across grades, thus producing an overall program total.

Two items may require explanation. First, clear and intact groups include students who had fall and spring test scores for a given year and were enrolled at the same school in Fall and Spring. Second, the 1980-81 data represent that year's test scores for 1981-82 students.

Overall, the total deviation means in Tables IV and VI show Prescription Learning students receiving reading and/or math tend to be the lower performing students in 1980-81 and 1981-82. The 1981-82 results show that

Prescription Learning and District Title I students had larger gains than District students in reading and math. However, Prescription Learning students made slightly smaller gains compared to District Title I students in reading and equivalent gains in mathematics.

An analysis of the 1981-82 results by grade shows Prescription Learning reading students made gains equivalent to District Title I students in grades 7 and 8, a smaller gain in grade 6, and a larger gain in grade 5. The sample size in grade 4 was too small to interpret. In mathematics, Prescription Learning students made equivalent gains in grades 5-8. Again, the sample size in grade 4 was too small to interpret.

Results for Prescription Learning students regardless of time in the program, although not shown, were calculated. These results include data from students who were in Prescription Learning less than 16 weeks as well as more than 16 weeks. It represents a more equivalent comparison group to District Title I students who were also selected regardless of time. When the data for Prescription Learning regardless of time are examined, the overall gains for Prescription Learning students receiving either readng and/or math are essentially unchanged. Thus, the exclusion of students in Prescription Learning less than 16 weeks from the Prescription Learning data does not effect its comparison to District Title I data.

Data for this year's Prescription Learning students from 1980-81 show they were, on the average, as low performing as data for this year's District Title I students from 1980-81. The data also show that this year's Prescription Learning students had slightly larger losses in 1980-81 than did this year's District Title I students.

The achievement growth of Prescription Learning students in 1981-82 was compared with their achievement growth in 1980-81. The results show Prescription Learning students made larger gains in 1981-82 as compared to 1980-81. Next, the difference in achievement growth made in 1981-82 compared to 1980-81 for a two-year matched group (i.e., students who had Fall and Spring test scores for 1980-81 and 1981-82) was calculated. This requires further explanation. The achievement growth for 1980-81 is subtracted from the achievement growth for 1981-82. For example, if students showed an achievement growth of .30 deviations in 1981-82 and an achievement growth of .20 deviations in 1980-81, then the difference in achievement growth made in 1980-81 compared to 1981-82 is .10 (i.e., .30 - .20). Similarly, if students showed an achievement growth of .30 deviations in 1981-82 and an achievement growth of -.20 deviations, then the difference in achievement growth made in 1980-81 compared to 1981-82 is .50 (i.e., .30 - (-.20). It is hypothesized the difference in achievement growth over two years can be attributed to the effects of the instructional program. After the difference in achievement growth is determined, it is finally compared to the District's achievement growth for the same two years in order to determine significance.

The difference in achievement growth made in 1981-82 compared to 1980-81 was calculated for a two-year matched growth of students in reading and mathematics. The results show Prescription Learning students made almost no change in achievement growth from 1980-81 in reading while a small non-significant positive gain was made in math. District Title I students made small, non-significant positive gains in reading and mathematics.

SCHOOLS

Data for Prescription Learning students were also examined by school. Tables VII and VIII show the RIT and deviation scores for Prescription Learning students in reading and math by school. School names are not identified and results are listed by rank order of gains in 1981-82. Individual schools were notified of their own schools rank.

The results for individual schools show a wide range of gains for 1981-82. Specifically, the data shows two schools (A and B) made gains beyond the District average while only one school (A) exceeded the average gain of District Title I students in reading. In mathematics, four schools (A through D) made gains beyond the District average while two schools exceeded the average gain of District Title I students.

The results for individual schools also show a wide range of gains in the difference in achievement growth made in 1981-82 compared to 1980-81. In reading, one school (A) showed a gain approaching significance and another school (B) showed a small, non-significant gain. In mathematics, one school (A) showed a significant gain and two schools (B and E) showed small, non-significant gains.

In summary, the data for Grades 4-8 show:

- Prescription Learning students tend to be the lower performing students in reading and mathematics.
- Overall, Prescription Learning students made slightly smaller gains compared to District Title I students in reading and equivalent gains in mathematics.
- By grades, Prescription Learning reading students made equivalent gains compared to District Title I students in grades 7 and 8, a smaller gain in grade 6, and a larger gain in grade 5. The sample size in grade 4 was too small to interpret. In mathematics Prescription Learning students made equivalent gains in grades 5-8. Again, the sample size in grade 4 was too small to interpret.
- Achievement growth for Prescription Learning students for 1981-82 was compared with the achievement growth in 1980-81. The results show Prescription Learning students made gains in 1981-82 as compared to losses in 1980-81.
- When data on the difference in achievement growth made in 1980-81 compared to 1981-82 based on a two-year matched group are examined, the results indicate virtually no change in achievement growth from one year to the next for reading, but a small non-signficant positive change in achievement growth in math.

RELATIONSHIP WITH VARIABLES

The evaluation investigated the relationship between student achievement and three variables: weeks in the program, minutes per week in the program, and the subject students missed by coming to the program.

WEEKS IN THE PROGRAM

The first variable investigated was time in the program. A Pearson correlation was performed between weeks in the program and reading, or math, gain. The correlation indicated no significant correlation ($r = .00$) between weeks in the program and reading gain and no signficant correlation ($r = -.01$) between weeks in the program and math gain. Students were then divided into three groups (16-22 weeks, 23-27 weeks, 28-31 weeks) to determine if students enrolled in Prescription Learning for a longer period had larger gains than students in a shorter period.

Tables IX and X show the RIT and standard deviation means for Prescription Learning students in reading by time by grade over the last two years while the math data is displayed in Tables XI and XII. Overall, the total deviations for 1981-82 in Tables X and XII show students who were in the reading program for 23-27 had larger gains than students enrolled for the longer or shorter intervals. Students in the math program made equivalent gains regardless of the time intervals.

Examination of the data revealed a possible explanation for the apparent lack of relationship between weeks in the program and either reading, or math, gain. The data show the number of students per school is not divided equally among the time intervals. In fact, a majority of students in four of the five schools are in the 28-31 time interval. In addition, only two schools comprise the population in the 23-27 weeks interval. Therefore, no defensible statement can be made about the relationship between time and either reading or math gain because students from each school are not equally represented in each time interval. At this time, it is difficult to rule out school effect.

In summary, the data for weeks in the program show:

- The Pearson correlation indicated no significant correlation ($r = .01$) between time in the program and reading gain and no significant correlation ($r = -.01$) between time in the program and math gain.

- Students in the reading program for the 23-27 weeks interval had larger gains than students enrolled for the longer or shorter intervals. Students in the math program made equivalent gains regardless of the time interval. However, a defensible statement about the relationship between time and either reading or math gain cannot be made at this time because students from each school are not equally represented in each time interval.

MINUTES PER WEEK

The second variable was minutes per week in the program. A Pearson correlation was performed between minutes per week and reading, or math, gain. The correlation indicated no significant correlation ($r = -.06$) between minutes per week and reading gain and no significant correlation ($r = .02$) between minutes per week and math gain. Students were then divided into three groups (75-124 minute, 125-174 minutes, and 175-225 minutes) to determine if students who received more minutes of instruction per week had larger gains than students who received fewer minutes of instruction.

Tables XIII and XIV show the RIT and deviation means for Prescription Learning students in reading by minutes per week by grade over the last two years while Tables XV and XVI show the math data. Overall, the total deviations in Table XIV show students in the reading program for 75-124 and 175-225 minutes had larger gains than students in the program for 125-174 minutes. In mathematics, students in 175-225 minutes had slightly larger gains than students in the program for 75-124 minutes. There were no students who received 125-174 minutes in math.

Further investigation of the data revealed a possible explanation for the apparent lack of relationship between minutes per week in the program and reading, or math, gain. Data was examined by school by time interval. It revealed the number of students per school are not equally represented among the minute per week intervals. In fact, almost all students at each school are in one interval while the other two intervals have more or only a few students. Thus, it is not clear if data reflect a time effect or an interaction with school differences.

In summary, the data for minutes per week in the program show:

- The Pearson correlation indicated no significant correlation ($r = -.06$) between minutes per week and reading gain and no significant correlation ($r = .02$) between minutes per week and math gain.

- Students in the reading program for 75-124 and 175-225 minutes had larger gains than students in for 125-174 minutes. In mathematics, students in 175-225 minutes had slightly larger gains than students in the program for 75-124 minutes. There were no students that received 125-174 minutes in mathematics. Further investigation of the reading results revealed it is not clear if the difference in gains is due to a time effect or an interaction with school differences.

SUBJECT MISSED

Schools identified and classified the subject students missed into five categories: reading instruction, reading seatwork, mathematics, language arts, and "other." Out of a total of 520 students for which data was available, 486 students missed "other," 27 students missed reading instruction, and 7 students missed language arts. Since almost all students missed "other subjects," the analysis was not conducted.

CONCLUSIONS

Students in the Prescription Learning Program for 16 weeks or more had smaller gains than overall District Title I students in reading, and equivalent gains in math as indicated by Portland citywide achievement test results. Only one of the five schools had gains above the average gain of the District Title I students in reading, and only two of the five exceeded the District Title I average in math.

Data on the difference in achievement growth made in 1980-81 compared to 1981-82 indicate no change in reading and a small non-significant positive gain in math. The overall achievement test results associated with the Prescription Learning Program in Portland, therefore at this point; (1) suggest that it is not as successful in reading and equally successful in math than other District Title I programs in helping students progress through the District's basic skills curriculum; and (2) it is important to determine how it can be effectively incorporated into a school's instructional program. Data for at least one more year are needed to substantiate these findings.

RECOMMENDATIONS

Differences in results between schools suggest that the effects of various program components such as teacher inservice, staff assignments, time on task, and the management system used be evaluated in the 1982-83 school year to determine what is the best implementation strategy for the Prescription Learning Program and whether the program can be made notably successful following such strategies.

TABLE III

Reading RIT Score Means for Prescription Learning, District Title I, and District Students for 1980-81 and 1981-82 by Grade

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference
GRADE 3					GRADE 4				
Presc. Learn.	7	--	--	--	Presc. Learn.	9	--	--	--
Title I, Dist.	344	169.5	176.0	6.5	Title I, Dist.	442	178.1	186.3	8.2
District	2479	187.1	193.6	6.5	District	2990	195.9	201.2	5.3
GRADE 4					GRADE 5				
Presc. Learn.	17	181.9	184.4	2.5	Presc. Learn.	30	181.5	190.9	9.4
Title I, Dist.	350	179.8	182.3	2.5	Title I, Dist.	436	184.1	191.8	7.7
District	2716	196.0	201.1	5.1	District	3217	203.3	207.4	4.1
GRADE 5					GRADE 6				
Presc. Learn.	71	186.1	189.0	2.9	Presc. Learn.	81	190.8	193.9	3.1
Title I, Dist.	358	185.4	188.5	3.1	Title I, Dist.	442	191.4	196.7	5.3
District	2982	202.7	207.4	4.7	District	3396	210.0	213.1	3.1
GRADE 6					GRADE 7				
Presc. Learn.	73	190.8	193.7	2.9	Presc. Learn.	87	195.2	198.3	3.1
Title I, Dist.	343	191.7	194.5	2.8	Title I, Dist.	393	196.4	199.6	3.2
District	2951	209.2	213.4	4.2	District	3311	215.4	217.6	2.2
GRADE 7					GRADE 8				
Presc. Learn.	66	195.9	196.9	1.0	Presc. Learn.	74	198.9	201.9	3.0
Title I, Dist.	289	194.9	197.1	2.2	Title I, Dist.	329	201.0	203.9	2.9
District	2825	214.0	217.3	3.3	District	3140	219.4	222.0	2.6

TABLE IV

Reading Standard Deviation Means for Prescription Learning, District Title I, and District Students for 1980-81 and 1981-82 by Grade

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference	N	Rate
GRADE 3					GRADE 4						
Presc. Learn.	7	-1.35	-2.73	-1.38	Presc. Learn.	9	--	--	--	6	--
Title I, Dist.	344	-2.52	-2.62	-0.10	Title I, Dist.	442	-2.83	-2.54	0.29	321	0.33
District	2479	0.20	0.22	0.02	District	2990	0.04	0.01	-0.03	ALL	0.00
GRADE 4					GRADE 5						
Presc. Learn.	17	-2.42	-2.53	-0.13	Presc. Learn.	30	-3.59	-2.87	0.72	19	0.36
Title I, Dist.	350	-2.78	-2.84	-0.06	Title I, Dist.	436	-3.16	-2.71	0.45	318	0.42
District	2716	0.16	0.16	0.00	District	3217	0.04	0.01	-0.03	ALL	0.00
GRADE 5					GRADE 6						
Presc. Learn.	71	-2.48	-2.52	-0.04	Presc. Learn.	81	-3.07	-3.19	-0.12	69	-0.02
Title I, Dist.	358	-2.57	-2.56	-0.01	Title I, Dist.	442	-2.96	-2.71	0.25	341	0.16
District	2982	0.13	0.15	0.02	District	3396	0.02	-0.03	-0.05	ALL	0.00
GRADE 6					GRADE 7						
Presc. Learn.	73	-2.78	-2.86	-0.08	Presc. Learn.	87	-3.28	-3.06	0.22	68	0.20
Title I, Dist.	343	-2.61	-2.72	-0.11	Title I, Dist.	393	-3.07	-2.85	0.22	308	0.24
District	2951	0.22	0.24	0.02	District	3311	0.10	0.05	-0.05	ALL	0.00
GRADE 7					GRADE 8						
Presc. Learn.	66	-2.53	-2.98	-0.45	Presc. Learn.	74	-3.33	-3.25	0.08	58	0.44
Title I, Dist.	289	-2.67	-2.95	-0.32	Title I, Dist.	329	-2.97	-2.90	0.07	262	0.26
District	2825	0.21	0.20	-0.01	District	3140	0.09	0.04	-0.05	ALL	0.00
TOTALS					TOTALS						
Presc. Learn.	234	-2.55	-2.76	-0.21	Presc. Learn.	281	-3.26	-3.10	0.16	220	0.23
Title I, Dist.	1684	-2.63	-2.73	-0.10	Title I, Dist.	2042	-3.00	-2.73	0.27	1550	0.28
District	13,953	0.18	0.19	0.01	District	16,054	0.05	0.02	-0.03	ALL	0.00

TABLE V

Math RIT Score Means for Prescription Learning, District Title I, and District Students for 1980-81 and 1981-82 by Grade

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference
GRADE 3					GRADE 4				
Presc. Learn.	7	--	--	--	Presc. Learn.	8	--	--	--
Title I, Dist.	293	171.8	177.9	6.1	Title I, Dist.	375	180.8	192.2	11.4
District	2419	183.9	192.2	8.3	District	2888	194.8	204.4	9.6
GRADE 4					GRADE 5				
Presc. Learn.	20	182.6	189.3	6.7	Presc. Learn.	29	190.5	197.2	6.7
Title I, Dist.	330	178.9	186.3	7.4	Title I, Dist.	407	189.3	195.9	6.6
District	2276	191.4	200.4	9.0	District	3129	205.0	210.2	5.2
GRADE 5					GRADE 6				
Presc. Learn.	75	189.0	193.7	4.7	Presc. Learn.	86	195.1	200.3	5.2
Title I, Dist.	358	188.1	193.7	5.6	Title I, Dist.	425	195.7	201.5	5.8
District	2876	203.5	210.2	6.7	District	3284	212.5	217.4	4.9
GRADE 6					GRADE 7				
Presc. Learn.	84	196.6	200.0	3.4	Presc. Learn.	106	199.4	204.2	4.8
Title I, Dist.	309	195.6	199.3	3.7	Title I, Dist.	361	201.0	206.3	5.3
District	2848	211.6	216.9	5.3	District	3238	219.4	223.8	4.4
GRADE 7					GRADE 8				
Presc. Learn.	67	199.2	201.4	2.2	Presc. Learn.	75	206.0	210.1	4.1
Title I, Dist.	275	200.7	204.1	3.4	Title I, Dist.	320	207.5	212.0	4.5
District	2761	217.5	223.8	6.3	District	3053	224.9	229.0	4.1

TABLE VI

Math Standard Deviation Means for Prescription Learning, District Title I, and District Title I and District Students for 1980-81 and 1981-82 by Grade

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference	N	Rate
GRADE 3					GRADE 4						
Presc. Learn.	7	--	--	--	Presc. Learn.	8	--	--	--	5	--
Title I, Dist.	293	-2.51	-2.84	-0.33	Title I, Dist.	375	-2.59	-2.35	0.24	274	0.58
District	2419	0.23	-0.04	-0.27	District	2888	0.05	0.04	-0.01	ALL	0.00
GRADE 4					GRADE 5						
Presc. Learn.	20	-1.89	-2.20	-0.31	Presc. Learn.	29	-2.59	-2.26	0.33	20	0.46
Title I, Dist.	330	-2.64	-2.75	-0.11	Title I, Dist.	407	-2.79	-2.49	0.30	297	0.22
District	2276	0.16	0.01	-0.15	District	3129	0.09	0.09	0.00	ALL	0.00
GRADE 5					GRADE 6						
Presc. Learn.	75	-2.39	-2.62	-0.23	Presc. Learn.	86	-3.06	-2.90	0.16	71	0.32
Title I, Dist.	358	-2.51	-2.61	-0.10	Title I, Dist.	425	-2.94	-2.70	0.24	336	0.24
District	2876	0.20	0.24	0.04	District	3284	0.03	0.00	-0.03	ALL	0.00
GRADE 6					GRADE 7						
Presc. Learn.	84	-2.54	-2.63	-0.09	Presc. Learn.	106	-3.45	-3.09	0.36	81	0.26
Title I, Dist.	309	-2.68	-2.71	-0.03	Title I, Dist.	361	-3.15	-2.75	0.40	282	0.42
District	2848	0.27	0.26	-0.01	District	3238	0.15	0.06	-0.09	ALL	0.00
GRADE 7					GRADE 8						
Presc. Learn.	67	-2.87	-3.02	-0.15	Presc. Learn.	75	-3.43	-3.03	0.40	66	0.57
Title I, Dist.	275	-2.62	-2.62	0.00	Title I, Dist.	320	-3.14	-2.73	0.41	256	0.34
District	2761	0.22	0.27	0.05	District	3053	0.09	0.00	-0.09	ALL	0.00
TOTALS					TOTALS						
Presc. Learn.	253	-2.51	-2.69	-0.18	Presc. Learn.	304	-3.21	-2.88	0.33	243	0.43
Title I, Dist.	1565	-2.59	-2.70	-0.11	Title I, Dist.	1888	-2.91	-2.60	0.31	1445	0.35
District	13,180	0.22	0.16	-0.16	District	15,592	0.08	0.04	-0.04	ALL	0.00

TABLE VII

READING STANDARD DEVIATION MEANS FOR PRESCRIPTION LEARNING STUDENTS FOR 1980-81 AND 1981-82 BY SCHOOL

	N	Fall 1980	Spring 1981	Difference	N	Fall 1981	Spring 1982	Difference	N	Rate
SCHOOL A										
DEV.	48	-2.39	-2.67	-0.28	64	-3.49	-2.85	0.64	42	0.65
RIT	48	186.6	188.7	2.1	64	188.2	195.7	7.5		
SCHOOL B										
DEV.	85	-2.50	-2.59	-0.09	92	-3.18	-2.94	0.24	78	0.39
RIT	85	191.4	194.3	2.9	92	195.2	199.4	4.2		
SCHOOL C										
DEV.	30	-3.10	-3.37	-0.27	48	-3.25	-3.16	0.09	38	-0.29
RIT	30	185.5	187.1	1.6	48	191.5	195.5	4.0		
SCHOOL D										
DEV.	55	-2.54	-2.67	-0.13	64	-3.32	-3.57	-0.25	52	0.08
RIT	55	190.0	192.6	2.6	64	193.0	194.2	1.2		
SCHOOL E										
DEV.	16	-2.26	-3.16	-0.90	13	-2.35	-2.93	-0.58	10	0.02
RIT	16	197.2	195.3	-1.9	13	203.9	202.7	-1.2		
TOTAL										
DEV.	234	-2.55	-2.76	-0.21	281	-3.26	3.10	.16	220	0.23
RIT	234	189.7	191.9	2.1	281	192.9	196.9	4.0		

TABLE VIII

MATH STANDARD DEVIATION MEANS FOR PRESCRIPTION LEARNING STUDENTS FOR 1980-81 AND 1981-82 BY SCHOOL

	N	Fall 1980	Spring 1981	Difference	N	Fall 1981	Spring 1982	Difference	N	Rate
SCHOOL A										
DEV.	52	-1.93	-2.15	-0.22	67	-2.57	-1.80	0.77	46	1.07
RIT	52	191.6	196.4	4.8	67	198.3	207.2	8.9		
SCHOOL B										
DEV.	31	-2.51	-3.72	-1.21	31	-4.21	-3.67	0.54	26	0.41
RIT	31	191.5	194.8	3.3	31	197.3	202.3	5.0		
SCHOOL C										
DEV.	86	-2.70	-2.74	-0.04	96	-3.32	-3.03	0.29	78	0.26
RIT	86	194.0	198.3	4.3	96	199.6	204.4	4.8		
SCHOOL D										
DEV.	24	-3.51	-2.85	0.66	43	-3.35	-3.19	0.16	38	0.17
RIT	24	193.0	194.6	1.6	43	196.3	200.7	4.4		
SCHOOL E										
DEV.	60	-2.32	-2.59	-0.27	67	-3.15	-3.17	-0.02	55	0.33
RIT	60	195.2	198.2	3.0	67	199.5	202.6	3.1		
TOTAL										
DEV.	253	-2.51	-2.69	-.18	304	-3.21	-2.88	.33	243	0.43
RIT	253	193.4	197.1	3.8	304	198.6	203.9	5.3		

TABLE IX

Reading RIT Score Means for Prescription Learning Students
for 1980-81 and 1981-82 by Time

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference
GRADE 3					GRADE 4				
16-22	1	--	--	--	16-22	1	--	--	--
23-27	0	--	--	--	23-27	0	--	--	--
28-31	6	--	--	--	28-31	8	--	--	--
GRADE 4					GRADE 5				
16-22	1	--	--	--	16-22	4	--	--	--
23-27	2	--	--	--	23-27	4	--	--	--
28-31	14	179.7	181.6	1.9	28-31	22	180.0	187.7	7.7
GRADE 5					GRADE 6				
16-22	6	--	--	--	16-22	7	--	--	--
23-27	5	--	--	--	23-27	8	--	--	--
28-31	60	186.5	188.7	2.2	28-31	66	189.9	193.1	3.2
GRADE 6					GRADE 7				
16-22	14	194.8	195.8	1.0	16-22	17	197.5	202.4	4.9
23-27	5	--	--	--	23-27	7	--	--	--
28-31	54	190.5	193.2	2.7	28-31	63	194.5	197.4	2.9
GRADE 7					GRADE 8				
16-22	16	205.3	206.4	1.1	16-22	13	208.5	210.9	2.4
23-27	3	--	--	--	23-27	6	--	--	--
28-31	47	192.7	195.0	1.0	28-31	55	196.9	199,9	3.0

TABLE X

Reading Standard Deviation Means for Prescription Learning Students
for 1980-81 and 1981-82 by Time

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference
GRADE 3					GRADE 4				
16-22	1	--	--	--	16-22	1	--	--	--
23-27	0	--	--	--	23-27	0	--	--	--
28-31	6	--	--	--	28-31	8	--	--	--
GRADE 4					GRADE 5				
16-22	1	--	--	--	16-22	4	--	--	--
23-27	2	--	--	--	23-27	4	--	--	--
28-31	14	-2.82	-2.99	-0.17	28-31	22	-3.85	-3.42	0.43
GRADE 5					GRADE 6				
16-22	6	--	--	--	16-22	7	--	--	--
23-27	5	--	--	--	23-27	8	--	--	--
28-31	60	-2.43	-2.56	-0.13	28-31	66	-3.22	-3.32	-0.10
GRADE 6					GRADE 7				
16-22	14	-2.11	-2.52	-0.41	16-22	17	-2.89	-2.39	0.60
23-27	5	--	--	--	23-27	7	--	--	--
28-31	54	-2.83	-2.95	-0.12	28-31	63	-3.40	-3.21	0.19
GRADE 7					GRADE 8				
16-22	16	-1.11	-1.50	-0.39	16-22	13	-1.73	-1.77	-0.04
23-27	3	--	--	--	23-27	6	--	--	--
28-31	47	-3.01	-3.47	-0.46	28-31	55	-3.67	-3.59	0.08
TOTALS					TOTALS				
16-22	38	-1.61	-1.94	-0.33	16-22	42	-2.37	-2.21	0.16
23-27	15	-3.24	-2.74	0.50	23-27	25	-3.22	-2.84	0.38
28-31	181	-2.69	-2.94	-0.25	28-31	214	-3.44	-3.30	0.14

TABLE XI

Math RIT Score Means for Prescription Learning Students
for 1980-81 and 1981-82 by Time

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference
GRADE 3					GRADE 4				
16-22	1	--	--	--	16-22	1	--	--	--
23-27	0	--	--	--	23-27	0	--	--	--
28-31	6	--	--	--	28-31	7	--	--	--
GRADE 4					GRADE 5				
16-22	1				16-22	2	--	--	--
23-27	2	--	--	--	23-27	5	--	--	--
28-31	17	182.1	187.4	5.3	28-31	22	190.9	196.9	6.0
GRADE 5					GRADE 6				
16-22	7	--	--	--	16-22	8	--	--	--
23-27	2	--	--	--	23-27	4	--	--	--
28-31	66	188.0	192.7	4.7	28-31	74	194.4	199.6	5.2
GRADE 6					GRADE 7				
16-22	23	195.5	198.7	3.2	16-22	33	196.9	202.4	5.5
23-27	5	--	--	--	23-27	7	--	--	--
28-31	56	197.0	200.4	3.4	28-31	66	200.5	205.0	4.5
GRADE 7					GRADE 8				
16-22	20	200.7	204.1	3.4	16-22	21	209.5	211.9	2.4
23-27	4	--	--	--	23-27	6	--	--	--
28-31	43	198.1	199.8	1.7	28-31	48	203.1	207.9	4.8

TABLE XII

Math Standard Deviation Means for Prescription Learning Students
for 1980-81 and 1981-82 by Time

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference
GRADE 3					GRADE 4				
16-22	1	--	--	--	16-22	1	--	--	--
23-27	0	--	--	--	23-27	0	--	--	--
28-31	6	--	--	--	28-31	7	--	--	---
GRADE 4					GRADE 5				
16-22	1	--	--	--	16-22	2	--	--	--
23-27	2	--	--	--	23-27	5	--	--	--
28-31	17	-2.01	02.58	-0.57	28-31	22	-2.51	-2.32	0.19
GRADE 5					GRADE 6				
16-22	7	--	--	--	16-22	8	--	--	--
23-27	2	--	--	--	23-27	4	--	--	--
28-31	66	-2.57	-2.79	-0.22	28-31	74	-3.18	-3.02	0.16
GRADE 6					GRADE 7				
16-22	23	-2.76	-2.84	-0.08	16-22	33	-3.89	-3.37	0.52
23-27	5	--	--	--	23-27	7	--	--	--
28-31	56	-2.47	-2.58	-0.11	28-31	66	-3.26	-2.97	0.29
GRADE 7					GRADE 8				
16-22	20	-2.62	-2.63	-0.01	16-22	21	-2.78	-2.74	0.04
23-27	4	--	--	--	23-27	6	--	--	--
28-31	43	-3.06	-3.25	-0.19	28-31	48	-3.97	-3.39	0.58
TOTALS					TOTALS				
16-22	52	-2.42	-2.49	-0.07	16-22	65	-3.26	-2.89	0.37
23-27	13	-2.12	-2.10	0.02	23-27	22	-2.54	-2.19	0.35
28-31	188	-2.56	-2.79	-0.23	28-31	217	-3.27	-2.94	0.33

TABLE XIII

Reading RIT Score Means for Prescription Learning Students
for 1980-81 and 1981-82 by Minutes

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference
GRADE 3					GRADE 4				
75-124	7	--	--	--	75-124	9	--	--	--
125-174	0	--	--	--	125-174	0	--	--	--
175-225	0	--	--	--	175-225	0	--	--	--
GRADE 4					GRADE 5				
75-124	13	180.9	184.3	3.4	75-124	16	182.3	192.6	10.3
125-174	0	--	--	--	125-174	0	--	--	--
175-225	4	--	--	--	175-225	14	180.7	188.9	8.2
GRADE 5					GRADE 6				
75-124	44	185.4	188.5	3.1	75-124	47	189.7	193.3	3.6
125-174	23	189.9	191.7	1.8	125-174	29	192.8	194.1	1.3
175-225	4	--	--	--	175-225	5	--	--	--
GRADE 6					GRADE 7				
75-124	34	189.5	192.5	3.0	75-124	44	193.6	197.8	4.2
125-174	25	192.0	195.0	3.0	125-174	24	195.2	195.8	0.7
175-225	14	191.6	194.3	2.7	175-225	19	199.1	202.6	3.5
GRADE 7					GRADE 8				
75-124	46	198.9	199.7	0.8	75-124	46	202.5	205.9	3.4
125-174	6	185.0	184.8	-0.2	125-174	10	188.9	191.5	2.6
175-225	14	190.5	192.7	2.2	175-225	18	195.8	197.7	1.9

TABLE XIV

Reading Standard Deviation Means for Prescription Learning Students
for 1980-81 and 1981-82 by Minutes

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference
GRADE 3					GRADE 4				
75-124	7	--	--	--	75-124	9	--	--	--
125-174	0	--	--	--	125-174	0	--	--	--
175-225	0	--	--	--	175-225	0	--	--	--
GRADE 4					GRADE 5				
75-124	13	-2.60	-2.55	0.05	75-124	16	-3.47	-2.58	0.89
125-174	0	--	--	--	125-174	0	--	--	--
175-225	4	--	--	--	175-225	14	-3.73	-3.21	0.52
GRADE 5					GRADE 6				
75-124	44	-2.59	-2.58	0.01	75-124	47	-3.24	-3.28	-0.04
125-174	23	-1.91	-2.14	0.23	125-174	29	-2.73	-3.13	-0.40
175-225	4	--	--	--	175-225	5	--	--	--
GRADE 6					GRADE 7				
75-124	34	-2.98	-3.05	-0.07	75-124	44	-3.57	-3.15	0.42
125-174	25	-2.59	-2.67	-0.08	125-174	24	-3.28	-3.45	-0.17
175-225	14	-2.62	-2.75	-0.13	175-225	19	-2.63	-2.36	0.27
GRADE 7					GRADE 8				
75-124	46	-2.07	-2.55	-0.48	75-124	46	-2.77	-2.60	0.17
125-174	6	--	--	--	125-174	10	5.00	4.96	0.04
175-225	14	-3.32	-3.59	-0.27	175-225	18	-3.85	-3.94	-0.11
TOTALS					TOTALS				
75-124	144	-2.46	-2.69	-0.23	75-124	162	-3.21	-2.92	0.29
125-174	54	-2.47	-2.69	-0.22	125-174	63	-3.30	-3.54	-0.24
175-225	36	-3.03	-3.17	-0.14	175-225	56	-3.36	-3.11	0.25

TABLE XV

Math RIT Score Means for Prescription Learning Students
for 1980-81 and 1981-82 by Minutes

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference
GRADE 3					GRADE 4				
75-124	7	--	--	--	75-124	8	--	--	--
125-174	0	--	--	--	125-174	0	--	--	--
175-225	0	--	--	--	175-225	0	--	--	--
GRADE 4					GRADE 5				
75-124	13	184.3	190.3	6.3	75-124	16	193.6	201.1	7.5
125-174	0	--	--	--	125-174	0	--	--	--
175-225	8	--	--	--	175-225	14	187.5	193.4	5.9
GRADE 5					GRADE 6				
75-124	68	188.3	193.4	5.1	75-124	77	194.9	199.8	4.9
125-174	0	--	--	--	125-174	0	--	--	--
175-225	7	--	--	--	175-225	9	--	--	--
GRADE 6					GRADE 7				
75-124	58	197.1	200.7	3.6	75-124	70	200.4	205.4	5.0
125-174	0	--	--	--	125-174	0	--	--	--
175-225	26	195.7	198.5	2.8	175-225	36	197.4	202.0	4.6
GRADE 7					GRADE 8				
75-124	40	200.8	203.8	3.0	75-124	45	207.4	211.1	3.7
125-174	0	--	--	--	125-174	0	--	--	--
175-225	27	196.9	197.7	0.8	175-225	29	204.6	209.5	4.9

TABLE XVI

Math Standard Deviation Means for Prescription Learning Students
for 1980-81 and 1981-82 by Minutes

	N	Fall 1980	Spring 1981	Difference		N	Fall 1981	Spring 1982	Difference
GRADE 3					GRADE 4				
75-124	7	--	--	--	75-124	8	--	--	--
125-174	0	--	--	--	125-174	0	--	--	--
175-225	0	--	--	--	175-225	0	--	--	--
GRADE 4					GRADE 5				
75-124	13	-1.56	-1.96	-0.40	75-124	16	-2.00	-1.56	0.44
125-174	0	--	--	--	125-174	0	--	--	--
175-225	8	--	--	--	175-225	14	-3.13	-2.94	0.19
GRADE 5					GRADE 6				
75-124	68	-2.52	-2.68	-0.16	75-124	77	-3.10	-2.99	0.11
125-174	0	--	--	--	125-174	0	--	--	--
175-225	7	--	--	--	175-225	9	--	--	--
GRADE 6					GRADE 7				
75-124	58	-2.46	-2.51	-0.05	75-124	70	-3.27	-2.91	0.36
125-174	0	--	--	--	125-174	0	--	--	--
175-225	26	-2.72	-2.88	-0.16	175-225	36	-3.80	-3.43	0.37
GRADE 7					GRADE 8				
75-124	40	-2.60	-2.67	-0.07	75-124	45	-3.17	-2.88	0.33
125-174	0	--	--	--	125-174	0	--	--	--
175-225	27	-3.26	-3.56	-0.30	175-225	29	-3.70	-3.13	0.57
TOTALS					TOTALS				
82 75-124	186	-2.42	-2.56	-0.14	75-124	216	-3.05	-2.75	0.30
125-174	0	--	--	--	125-174	0	--	--	--
175-225	68	-2.71	-3.01	-0.30	175-225	88	-3.55	-3.12	0.43

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EVALUATION REPORT

ON

COMPUTER-ASSISTED INSTRUCTION

DECEMBER 1982

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COMPUTER USE IN THE SCHOOLS

Introduction

Schools in the Portland District initiated a wide variety of Computer-Assisted Instruction (CAI) during the 1981-82 school year. Although there was a variety of considerations, such as, hardware and software, student groups and schedules, subject content and grade level, this evaluation of CAI included those elementary schools whose programs were in place before the fall of 1981 and where previous arrangements for collecting and managing pre- and post-data were made.

Computer Assisted Instruction (CAI) evaluated in the Portland Public Schools was implemented through the use of microcomputers (Radio Shack TRS-80's) and time-share with the District using Computer Curriculum Corporation (CCC) software. Radio Shack software was used with the Radio Shack TRS-80 microcomputers. A total of 463 low-achieving students from three middle schools participated in these two instructional programs: 416 students representing three schools used the CCC time-share program and 47 students from one other school used the TRS-80 microcomputers. These schools were selected because their CAI programs were underway spring 1981 and were ready to begin in the fall of 1981.

Both the CCC and TRS-80 programs provided diagnostic/prescriptive drill and practice within the limits of the software. The CCC software was supplemental in math, reading and language usage, and the TRS-80 software was supplemental only in math. Each school used different criteria for placing students in the programs. (See separate descriptions for each school.) A variety of other programs using computers during the school year were started too late to be evaluated.

An evaluation was conducted to investigate the effects of the computer-assisted instruction programs. It compared the gains of CAI students across schools and across grades. Student achievement was assessed by Fall and Spring administrations of the Portland Achievement Levels Tests in reading, language usage and mathematics. Data was collected for 1980-81 and 1981-82. The data are displayed in tables using RIT scores, standard deviations and RATE for clear and intact groups. These are defined as follows:

1. A RIT score is an equal interval scale score used to measure student progress on the Portland Achievement Levels Tests.

2. Deviation scores represent the standard deviations of the RIT score from the mean of school means.

3. RATE matches students' CAI performance with their non-CAI performance of the previous year and shows the difference. (Gain)

4. Clear and intact groups (matched groups) include students who had Fall and Spring test scores for a given year and were enrolled at the same school in Fall and Spring.

   The 1980-81 data included only those students that are included in the 1981-82 data.

Description of School Programs
Boise School

Boise School provided Computer-Assisted Instruction (CAI) to students in grades five through eight using the Computer Curriculum Corporation (CCC) program staffed by one full-time teacher and one part-time aide. This program was designed to provide individualized drill and practice in the basic skill areas of math, reading, and language usage with immediate feedback to the student and teacher. It featured sophisticated diagnosis, branching, and record keeping. Boise School is unique in that it has been designated as a school-wide Title I project due to the low socio-economic level of the community, and the fact that the majority of the students qualify for Title I supplementary instruction. Therefore, the students identified as Title I may not be low achievers. Eight terminals were used to provide computer assisted instruction to students in grades five through eight. Students were placed in the CCC math, reading, or language program at a level lower than their instructional level. If this placement turned out to be too low, students were advanced by half-year increments until the appropriate level was reached.

During the morning, all seventh and eighth graders attended lab for 45 minutes in groups of approximately 20 students. Thirty-five minutes of this time was spent in individualized math programs using either Individualized Computational Skills Program (ICSP) materials or teacher-developed materials. Each student spent 10 minutes on the computer terminals practicing their math skills using CCC software entitled "Math 1-6." Two students were placed in the Middle Math program by the end of the year. One day per week all students worked on problem-solving skills. As a subgroup of one of these seventh and eighth grade groups, four second graders, one third grader, and one sixth grader - all high achievers - attended math lab to use the computer terminals. All seventh and eighth grade students attended a second math class each morning where they received instruction in concepts. Computers were not used in the concepts class. Eighty-five students were served in this math program. During the morning planning period the CCC instructor taught one class of sixteen fifth and sixth grade students using the ISCP and CCC programs. The classroom teacher was responsible for their instruction, and the fact that the majority of students qualify for Title I supplementary instruction.

In the afternoon, three groups of fifth and sixth graders and one group of seventh graders received services in reading and language usage. Altogether forty students were selected on the basis of attendance, behavior, and learning style as well as their teachers' judgement on who would gain the most by participation in a Computer-Assisted Instruction reading program. Thirty of these students were clear and intact. Students receiving reading and language assistance attended lab for 20 minutes each day. Ten minutes were spent in reading instruction with most students using CCC software entitled "Reading for Comprehension." One student worked in the "Critical Reading Skills" program offered by CCC. The other 10 minutes were spent in language instruction using the CCC software entitled "Language Arts 3-6." The homeroom teachers who were responsible for basic reading and language instruction, received a weekly report of their students' progress from the CCC instructor. These reports were taken off the CCC printer. Each month the CCC instructor presented certificates to those students who, according to the printout, showed the most gain in math, reading, or language.

Portsmouth Middle School

Computer-Assisted Instruction at Portsmouth was implemented through the use of the Computer Curriculum Corporation (CCC) program for Title I students only. This program was designed to provide individualized drill and practice in the basic skill areas of reading and math with immediate feedback to the teacher and student. It featured sophisticated diagnosis, branching and record keeping. Courses offered at Portsmouth included: 1) Basic Reading; 2) Reading 3-6; 3) Reading for Comprehension; and 4) Math 1-6.

All computer-assisted instruction occurred in a lab setting. After spending 30 minutes in small group instruction with one of the four Title I aides, students worked 10 minutes at one of the twelve computer terminals practicing their math or reading skills. A Title I coordinator supervised all Title I activities. It was possible for some students to receive assistance in both math and reading, thereby doubling the time spent in lab and on the computers. Approximately 50 fifth through seventh graders received services in math. About 150 fifth through eighth graders received services in reading. It is the intent of the CCC program that students remain in the program for the full school year. This was the case at Portsmouth, with the exception of those students that moved mid-year. New students were taken on a space available basis.

Student selection was based on a P-score of 43 or less on the Portland Achievement Levels Test. Stanford Diagnostic Test results and teacher judgement were also taken into consideration. After students were selected, they were given a series of 10 placement tests to determine their skill deficiencies and their instructional level. Once these were determined, students were placed at the appropriate level in the instructional materials.

On occasion the CCC terminals were used for the purpose of demonstrating the program to non-Title I students, school district personnel, parents, or educators from outside the district. Short demonstration programs were used for this purpose. The lowest achieving Title I students were encouraged to attend lab before and/or after school to spend additional time on the terminals. If space permitted, non-Title I students were also allowed to work on the computers before and after school.

Tubman Middle School

Tubman Middle School operated two computer-assisted instruction programs for the sixth through eighth grade students. One program consisted of 35 TRS-80 microcomputers placed at Tubman by the Radio Shack Corporation with the understanding that the school could be used as a demonstration site for other school districts. The other system consisted of eight Computer Curriculum Corporation (CCC) terminals. Both systems operated in a lab setting.

Students were selected for either the CCC program or the Radio Shack TRS-80 Title I program on the basis of need as demonstrated by a P-score of 43 or below on the Portland Achievement Levels Test, or on the basis of their schedules. All students scheduled into the TRS-80 math program needed to have a double block of time in order to participate.

The continuous progress system at Tubman necessitates the constant movement of students based on their level of skill. Because of this continual movement students enter and exit the computer-assisted instruction programs at various times throughout the year. Except for the movement necessitated by continuous progress, CCC students began the program in November and stayed throughout the year. Students using the Radio Shack TRS-80 microcomputers started their program at the end of September and continued through June.

The CCC program was designed to provide individualized drill and practice in the basic skill areas of reading and math with immediate feedback to the student and teacher. The CCC program featured sophisticated diagnosis, branching and record keeping. Courses offered were: 1) Reading 3-6; 2) Reading Comprehension; 3)General Math 1-6; and 4) Middle Math. Students worked 10 minutes on the computer, five days a week, for each session in which they were registered. An instructional aide managed the CCC program at Tubman. On occasion, classroom teachers attended with the students. Coordination of instructional objectives did not occur between the classroom and the CCC program.

Once students were selected for the CCC program they were administered a series of 10 placement tests on computer terminals to assess their achievement levels. This process identified reading and/or math deficiencies and placed students at the appropriate level in the instructional materials.

Students in grades six through eight participated in the reading component of the CCC program. All of these students (N=64) were Title I students. Seventh and eighth graders (N=36) participated in the CCC math component. Most of these students were not Title I. One class of special education students (N=10) containing grades five through eight used the CCC terminals the last period of the day to practice math skills. Approximately 150 students participated in the CCC program during the 1981-82 school year.

The Radio Shack TRS-80 microcomputers were used with sixth through eighth grade Title I math students (N=47). The TRS-80s were not used for reading instruction. Students were scheduled into a double block of math time which allowed them 20 minutes per day on the computers. An additional 60 minutes per day was spent in direct teacher instruction developing concepts and working on math applications. Computer time focused on drill and practice of

basic computational skills. The software used included: 1) Radio Shack's K-8 math program which provided practice in addition, subtraction, multiplication and division; 2) Radio Shack's essential math program which provided practice in number concepts and fractions; and 3) simple drill and practice programs used for multiplication and division facts.

Computer games were used as a reward for students who finished a designated number of lessons or mastered a certain skill. Students earned a pass to attend the computer lab during noon time or on Fridays.

The Radio Shack TRS-80 microcomputers were also used for the purpose of teaching computer elective courses. Initially nine weeks in length, classes were changed to 18 weeks in January to accommodate scheduling. Participation in the computer electives was by student choice (N=168). Nine courses were offered each term - five beginning, three intermediate, one advanced. The main instructional emphasis was computer programming. Students used their programming skills to solve assigned problems or to create routines of their own design. Besides specific computer knowledge, students gained experience in coordinate graphing, algebra, number sequences, and defining relationships. Two classroom teachers coordinated the TRS-80 instructional programs.

Findings

The data comparing the CAI year (1981-1982) with the non-CAI year (1980-1981) for the three schools show (Tables I, II, III, and IV):

- Achievement growth of the CAI schools for 1981-1982 was compared with their achievement growth for 1980-1981 (Tables I and II). Table I shows CAI students (N=194) in reading made a total gain of .60 during the CAI year and a total gain of .02 during their non-CAI year (N=170). When matching the CAI students with their previous non-CAI year (N=150) RATE, a comparative statistic, was obtained. Reading data for the two-year match groups (RATE = .52) indicate positive, non-significant gains for all three schools. RATE for individual schools (.51, .59, and .32) shows each school made positive, non-significant gains in reading. The data for mathematics in Table II show CAI students in math made a total gain of .71 during their CAI year (N=184) and a total gain of .14 during their non-CAI year (N=152). Mathematics data for the two-year match groups (N = 133) show positive non-significant gains (RATE = .48) in mathematical achievement. The RATE for each school indicates two schools made non-significant, positive achievement gains, and one school made gains approaching significance. Together, CAI schools made positive, non-significant gains in reading (.52) and mathematics (.48).

- The data for the two-year match group of CAI students using the CCC system in mathematics (Table III) show one school making no gain, one school making a positive, non-significant gain, and one school making a gain approaching significance. The gain for the TRS-80 two-year match group (Table IV) is positive and non-significant.

Data showing gains of CAI, District Title I, students by grades are presented in Tables V and VI:

- In Table V the CAI total gain (.52) and the District Title I total gain (.27) represent similar patterns of growth in reading for low-achievers. Consistent patterns of growth were also noted in mathematics (Table VI) for CAI students (.48) and District Title I students (.36).

The literature does suggest that experience with computers in drill and practice instruction warrants the following conclusions:

1. Computers can provide an effective mechanism (text, voice, graphics, pictures) for presenting instruction.
2. Computers can provide immediate feedback.
3. Computers with storing and retrieval capacity can effectively manage instruction.
4. CAI instruction of educationally-deprived students is as effective as traditional instruction.
5. Long range impact of computer use on individual learning is largely unknown.

Conclusions

Comparisons of reading and mathematics gains of CAI students to their own performance the year before using CAI and showing information from the District Title I group indicates in general non-significant positive gains. Patterns of low-achieving CAI students' performances on basic skills tests in reading and mathematics indicate that before computer-assisted instruction programs are more widely funded, a concerted effort needs to be made to determine if and how they can be effectively and efficiently used in the district. Different programs existing in three elementary schools, with one school using two different published software packages, have shown mixed results. It is evident that the nature of the instructional program and its scheduling in different school settings impact student achievement connected with computer use. Since the microcomputers were also used in a programming and computer literacy program, flexibility of use they afford should be considered.

Recommendations

It is important that assignment of resources channeled toward use of CAI give high priority to finding out the answers to two key questions, namely how and with whom it should be used for basic skills attainment and remediation. The absence of significant, positive achievement gains brings into question both the 1) use of software and the 2) amount of time the students were using the computer. Three other time-honored questions concerning learing in a school setting cannot be side-stepped or left to the commercial enterprises for investigation: 3) transfer of training from computer to pencil and paper; 4) which students have their learning facilitated or innhibited by the methodology; and 5) retention of information. An evaluation design that includes manipulating school schedules and curriculum must be planned around these five specific questions. It is necessary to go beyond the practice of evaluating programs "as they exist" and to address instructional and scheduling components of CAI programs.

TABLE I

Reading RIT Scores and Deviation Means for CAI Students
1980-1981 and 1981-1982 by Schools

School	N	Fall 1980	Spring 1981	Diff	N	Fall 1981	Spring 1982	Diff	N	Rate
TUBMAN										
DEV	57	-4.01	-3.86	.15	60	-4.12	-3.62	.44	47	.51
RIT	57	180.32	184.30	3.98	64	187.88	193.75	5.88		
PORTSMOUTH										
DEV	83	-3.73	-3.78	-.05	105	-4.42	-3.67	.75	77	.59
RIT	83	180.05	182.57	2.52	105	183.33	191.47	8.13		
BOISE										
DEV	30	-1.56	-1.63	-.07	29	-2.01	-1.64	.37	26	.32
RIT	30	190.80	194.07	3.27	29	196.41	202.17	5.76		
TOTAL										
DEV	170	3.44	-3.43	.02	194	-3.96	-3.36	.60	150	.52
RIT	170	182.04	185.18	3.14	198	186.72	193.77	7.06		

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TABLE II

Math RIT Scores and Deviation Means for CAI Students
for 1980-1981 and 1981-1982 by Schools

School	N	Fall 1980	Spring 1981	Diff	N	Fall 1981	Spring 1982	Diff	N	Rate
TUBMAN										
DEV	64	-2.74	-2.61	.10	81	-2.99	-2.37	.63	57	.36
RIT	65	190.57	196.20	5.63	83	199.21	206.26	6.51		
PORTSMOUTH										
DEV	29	-3.84	-3.21	.66	40	-3.97	-2.70	1.43*	25	.71
RIT	29	174.83	185.00	10.17	40	183.80	196.40	12.60		
BOISE										
DEV	59	-1.68	-1.75	-.07	63	-1.90	-1.55	.36	51	.51
RIT	59	200.61	204.90	4.29	63	209.03	214.84	5.81		
TOTAL										
DEV	152	-2.53	-2.39	.14	184	-2.83	-2.16	.71	133	.48
RIT	153	191.46	197.43	5.97	186	199.22	207.04	7.58		

*Significant at 5 percent level.

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TABLE III

Math RIT Scores and Deviation Means for CCC Students
for 1980-1981 and 1981-1982 by Schools

School	N	Fall 1980	Spring 1981	Diff	N	Fall 1981	Spring 1982	Diff	N	Rate
TUBMAN										
DEV	28	-.85	-.48	.37	36	-1.06	-.47	.59	26	.14
RIT	28	203.57	210.93	7.36	36	210.03	217.62	6.36		
PORTSMOUTH										
DEV	29	-3.84	-3.21	.66	40	-3.97	-2.70	1.43*	25	.71
RIT	29	174.83	185.00	10.17	40	183.80	196.40	12.60		
BOISE										
DEV	59	-1.68	-1.75	-.07	63	-1.90	-1.55	.36	51	.51
RIT	59	200.61	204.90	4.29	63	209.03	214.84	5.81		
TOTAL										
DEV	116	-2.00	-1.80	.22	139	-2.27	-1.60	.73	102	.46
RIT	116	194.88	201.38	6.50	139	202.09	210.31	7.91		

*Significant at 5 percent level.

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TABLE IV

Math RIT Scores and Deviation Means for TRS-80 Students
for 1980-1981 and 1981-1982

	N	Fall 1980	Spring 1981	Diff	N	Fall 1981	Spring 1982	Diff	N	Rate
TOTAL										
UEV	37	-4.35	-4.45	-.10	45	-4.54	-3.88	.66	31	.55
RIT	37	180.73	185.05	4.32	47	190.70	197.32	6.62		

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TABLE V

Reading Standard Deviation Means for CAI, District Title I, and District Students for 1980-81 and 1981-82 by Grade

	N	Fall 1980	Spring 1981	Diff		N	Fall 1981	Spring 1982	Diff	N	Rate
GRADE 4					GRADE 5						
CAI	38	-2.95	-3.03	-.08	CAI	45	-3.80	-3.08	.72	(34)	.66
Title I, Dist	350	-2.78	-2.84	-.06	Title I, Dist	436	-3.16	-2.71	.45	(318)	.42
GRADE 5					GRADE 6						
CAI	64	-3.39	-3.36	.03	CAI	72	-3.74	-3.24	.49	(58)	.48
Title I, Dist	358	-2.57	-2.56	-.01	Title I, Dist	442	-2.96	-2.71	.25	(341)	.16
GRADE 6					GRADE 7						
CAI	45	-3.49	-3.57	-.08	CAI	54	-3.94	-2.03	.70	(41)	.68
Title I, Dist	343	-2.61	-2.72	-.11	Title I, Dist	393	-3.07	-2.85	.22	(308)	.24
GRADE 7					GRADE 8						
CAI	23	-4.30	-3.99	.31	CAI	23	-4.78	-4.36	.43	(17)	.16
Title I, Dist	289	-2.67	-2.95	-.32	Title I, Dist	329	-2.97	-2.90	.07	(262)	.26
TOTALS											
CAI	170	-3.44	-3.43	.02	CAI	194	-3.96	-3.36	.60	(150)	.52
Title I, Dist	1340	-2.66	-2.76	-.10	Title I, Dist	1600	-3.04	-2.78	.26	(1229)	.27

*ALL represents clear and intact students for 1980-81 and 1981-82.

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TABLE VI

Math Standard Deviation Means for CAI, District Title I, and District Students for 1980-81 and 1981-82 by Grade

	N	Fall 1980	Spring 1981	Diff		N	Fall 1981	Spring 1982	Diff	N	Rate
GRADE 4					GRADE 5						
CAI	24	-3.49	-2.58	.61	CAI	35	-3.80	-2.70	1.29	(20)	.59
Title I, Dist	330	-2.64	-2.75	-.11	Title I, Dist	407	-2.79	-2.49	.30	(408)	.28
GRADE 5					GRADE 6						
CAI	49	-2.47	-2.41	-.11	CAI	54	-2.59	-1.88	.71	(40)	.52
Title I, Dist	358	-2.51	-2.61	-.10	Title I, Dist	425	-2.94	-2.70	.24	(426)	.26
GRADE 6					GRADE 7						
CAI	48	-2.38	-2.60	-.04	CAI	57	-2.74	-2.24	.50	(45)	.52
Title I, Dist	309	-2.68	-2.71	-.03	Title I, Dist	361	-3.15	-2.75	.40	(358)	.40
GRADE 7					GRADE 8						
CAI	31	-2.11	-1.89	.44	CAI	38	-2.41	-1.92	.49	(28)	.30
Title I, Dist	275	-2.62	-2.62	.06	Title I, Dist	320	-3.14	-2.73	.41	(372)	.42
TOTALS											
CAI	152	-2.53	-2.39	.14	CAI	184	-2.83	-2.16	.71	(133)	.48
Title I, Dist	1272	-2.61	-2.68	-.07	Title I, Dist	1513	-2.99	-2.66	.33	(1564)	.36

*ALL represents clear and intact students for 1980-81 and 1981-82.

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